AVIATION WEEK

50 CENTS

TARGET: SUBMERGED SUB

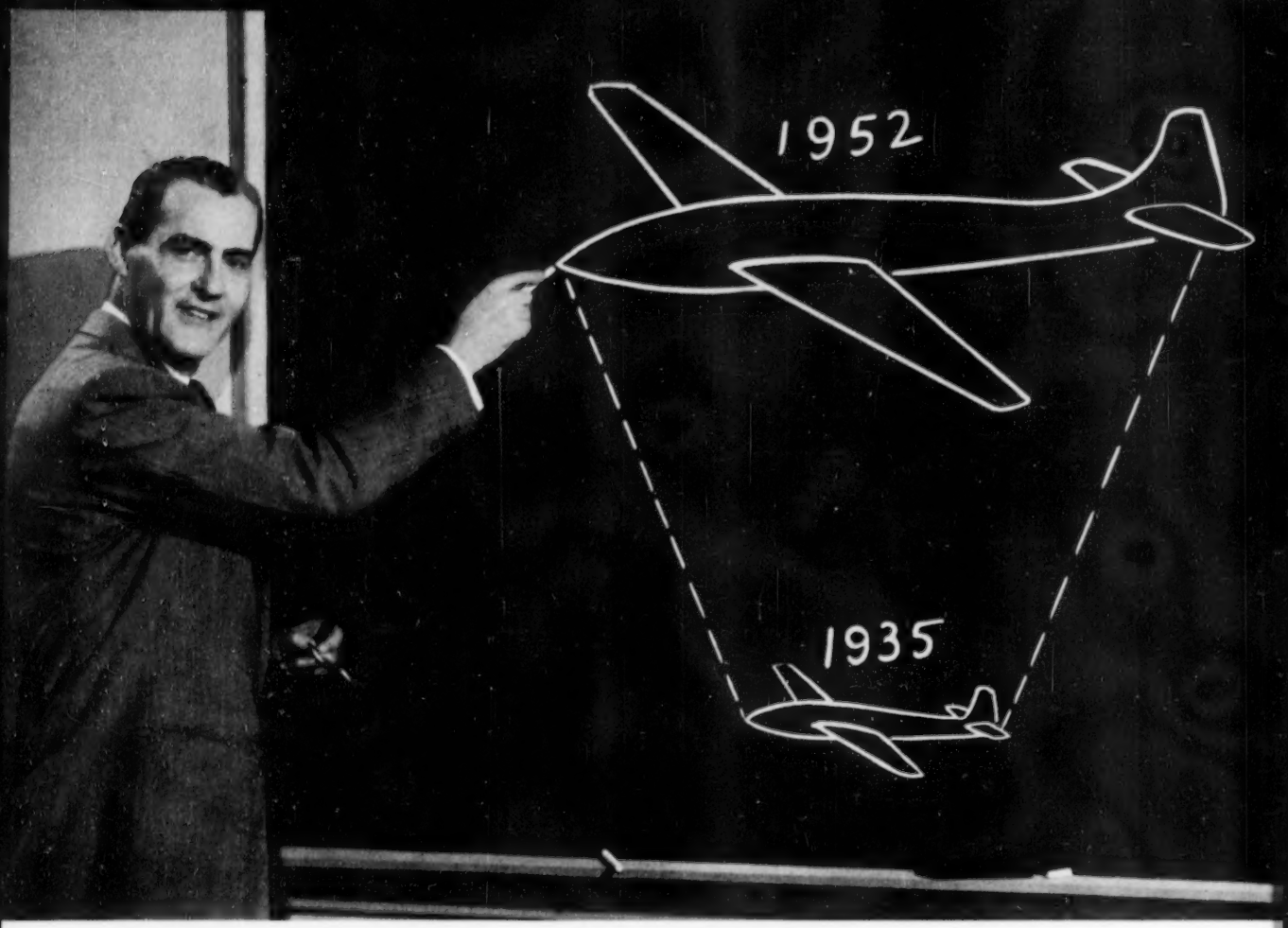
NIGHT, FOG, and the sea cloak an enemy submarine. But above, a Grumman S2F-1 hunts with electronic gear that detects and plots and feeds information to the four-man crew. The unseen sub is pinpointed and a torpedo arcs into the fog. It "homes" underwater and hits.

For a carrier-based plane to do all this, and more, posed problems that had to be solved by invention. This ability of Grumman engineers and technicians is but one reason why Grumman aircraft have been a mainstay of U. S. Naval Aviation.

Grumman

GRUMMAN AIRCRAFT ENGINEERING CORPORATION BETHPAGE • LONG ISLAND • NEW YORK

DESIGNERS AND BUILDERS ALSO OF THE PANTHER AND COUGAR JET FIGHTERS, AND THE ALBATROSS TRIPHIBIAN



Why planes need AC power today...

It's no secret that DC power was highly popular in pioneering days of electricity. But development of the transformer and polyphase motor, plus inherent limitations on the transmission and utilization of DC power caused a turnabout which affected homes, businesses, and industries. Today more than 99% of the power generated on the ground is of the AC type.

All signs point towards a similar trend to AC power aboard planes. When planes were small and had a relatively light electrical load, the DC system was adequate. It still is the best system for low power requirements and for about 2% of the electrical components used in large aircraft.

But statistics reveal that the electrical load is increasing rapidly in proportion to the total weight of the plane. In military aircraft, demand per plane in 1924 approximated 1 kw. Today the B-36 requires 120 kw. As new planes require more and more radar equipment, homing devices, armament systems, search apparatus . . . as demand increases for longer range, greater load, higher altitude, more maneuverability . . . the need for lighter weight, higher voltage, more flexible, constant frequency AC systems is intensified.

Of all methods used to develop constant frequency AC power, the simplest, most practical system developed to date is designed around Sundstrand Constant Speed Drives. Through years of costly design and experiment, reliable Sundstrand Drives are now available in a variety of types and sizes which help solve problems of both the engine and airframe manufacturer. For the complete story . . . and for help on adapting Sundstrand Drives to *your* designs . . . phone, wire, or write us.

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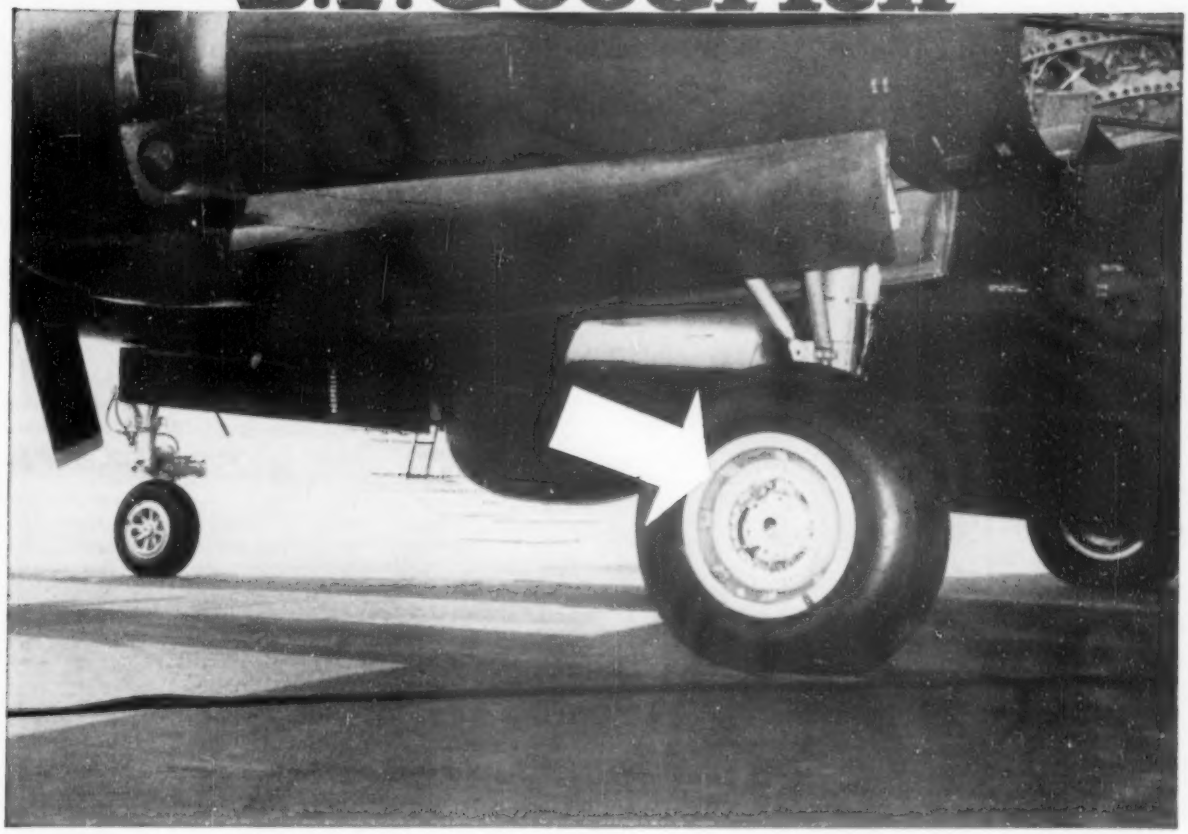

The weight B.F.Goodrich saved here...is still on this plane

NO MATTER what job the Navy thinks up for Lockheed's Neptune, it always turns out that a lot of equipment has to be taken along. Maybe it's electronic search equipment, and/or a lot of added armament, but whatever it is, it's important. The airplane has been designed through many changes, always stepping up her capacity to carry more useful load.

Some of this weight-saving comes out of landing equipment. From the beginning, this famous series has been equipped with B. F. Goodrich wheels, brakes, tires. One of the weight-saving changes on the BFG brakes is a new kind of brake block. No rivets are used. The lining is cemented onto a light magnesium shoe. And the brakes last longer because more of the lining is used.

Another way the brake was made lighter (and better): The B. F. Goodrich expander tube principle has the basic advantage that braking action applies equal pressure over the full circle of the drum, giving greater braking power, better load distribution. Today's B. F. Goodrich brake has a new, narrow-cavity tube that gives even *more* braking pressure, with *less* fluid, and, of course, *lighter* weight.

Landings on the new brakes are safer, smoother. The brakes respond smoothly and quickly to minimum pressure, take emergency overloads better, cannot lock or grab. There are other advantages. Ventilated shoe dissipates heat more rapidly. Retractor spring action eliminates wear due to drag. Relining can be handled with a screwdriver and wrench.

The B. F. Goodrich wheels on the Neptune are light, strong magnesium castings. Tires are the lightest weight practicable for the loads carried. These developments for greater safety *and* less weight are typical of continuing product improvement at B. F. Goodrich.

Send this coupon if you would like more information about any B. F. Goodrich aeronautical products. Check the items, print your name and address in the margin below (or pin to your company letterhead).

- ☐ Tires
- ☐ Wheels and Brakes
- ☐ De-Icers
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- ☐ Plastilock Adhesives
- ☐ Pressure Sealing Zippers
- ☐ Canopy Seals
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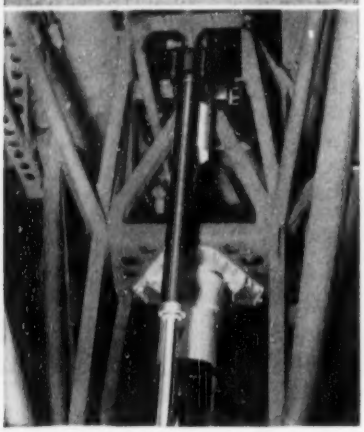
- ☐ Hose and other accessories
- ☐ Please have representative call

Mail to The B. F. Goodrich Co., Dept. A-79, Akron, Ohio

ZP2K LANDING GEAR

Airborne Actuated



The landing gear in Goodyear's ZP2K Navy blimp is actuated by Airborne's R-534M1 LINEATOR with a 12½ in. stroke. Airborne electro-mechanical actuators are specified by Goodyear — and most other manufacturers of military aircraft — for two reasons: they provide high power output in a minimum of space, and they can be counted on, however rugged the conditions.

Dimensions and data on Airborne products for the aviation industry are given in the I.A.S. Aeronautical Engineering Catalog.

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PROJECT TINKERTOY

Released By The Government And Now Available To Industry

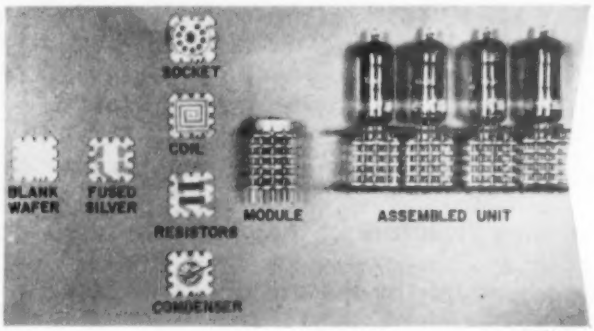
what it is

Project TINKERTOY is the code name for a development by the National Bureau of Standards. It consists of a design system and automatic machinery for the MECHANIZED PRODUCTION OF ELECTRONIC EQUIPMENT. This program was sponsored by the Navy Bureau of Aeronautics as an industrial preparedness measure in production research.

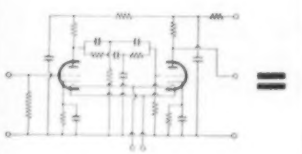
how it affects your production of electronic equipment

A high speed mechanized production process, the Project TINKERTOY method is also economical for small quantities.* Production of one *or* one million units is practical without design change. The ultimate in standardization of tooling and assembly is possible, and a minimum of skilled labor is required. Under this new design system you easily shift production over a wide range of products — rapidly and economically. This new mechanized production method guarantees uniformity of product *plus* automatic quality control, giving increased reliability. Production engineering costs are minimized because the development model actually *is* the final production design.

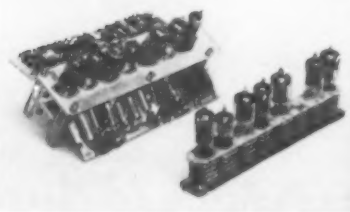
* Small pilot runs, using an equivalent hand module assembly method, are actually competitive with quantity production runs by present day methods.



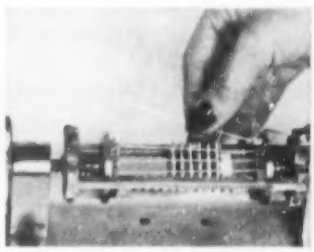
The heart of the N.B.S. system is the "module", consisting of half a dozen ceramic wafers interconnected by a dozen "riser" wires. Each wafer can contain as many as four tape resistors, ceramic disk condensers, or a tube socket, plus silvered connections to the proper riser wire. A single module can contain an entire circuit including a tube socket and twenty components as illustrated below left. Coils and other miscellaneous components can also be included. Several modules can be sandwiched between two photo-etched circuits providing a complete package. Audio, video, IF and RF amplifiers; oscillators, sweep circuits and counters have been made by this method. Tests by Sanders Associates have shown this equipment capable of withstanding environmental conditions beyond Military requirements.



This ... circuit can be contained in one module



Section of radio altimeter before and after adaptation to Project TINKER-TOY by Sanders Associates



Hand module assembly jig

Sanders Associates is proud to have been a member of the team contributing to this revolutionary development of the National Bureau of Standards and sponsored by the Navy Bureau of Aeronautics. Our responsibility was the developing and establishing of hand assembly facilities for pilot-line production. Sanders Associates successfully applied the Project TINKERTOY principles to a submarine detecting device, a radio altimeter and other military equipments.

Now Sanders Associates is able to offer to the industry its "know-how" obtained during two years of redesign engineering in association with Project TINKERTOY. We are ready to assist in engineering the conversion of conventional electronic equipment to the modular design technique, leading to automatic production. Why not send for our recent bulletin on Project TINKERTOY? Address inquiries to Department 63.

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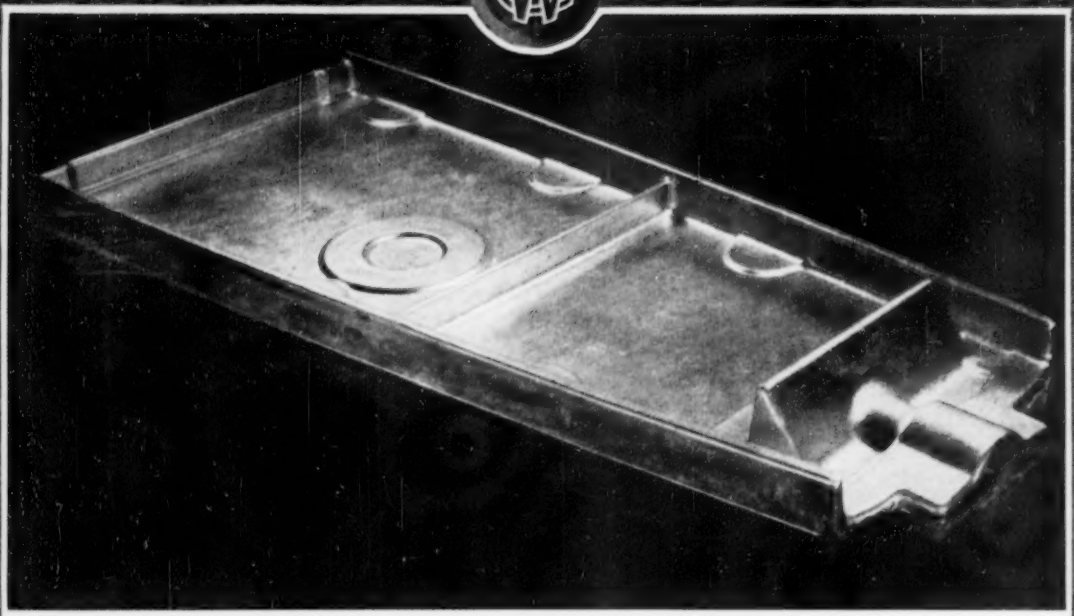
reliability in electronics



Are you taking full advantage of the constantly growing range of forgings? Typical is this aluminum alloy forging with a projected area of more than 1,000 square inches used in the wing structure of a modern military bomber. Such forgings are today made possible by the use of the largest die forging press in America (18,000 tons). For hammer or press die forgings of aluminum, magnesium or steel, Wyman-Gordon engineers are ready to serve you—there is no substitute for Wyman-Gordon experience.

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NEWS DIGEST

Domestic

Glenn L. Martin Co. will stick to building military aircraft at its Baltimore plant because of commercial losses totaling $45 million on 2-0-2 and 4-0-4 transports and $650,000 on three Clippers, forecasts G. T. Willey, Martin vice president-manufacturing.

Doman Helicopters, Danbury, Conn., is setting up a Canadian subsidiary in Fleet Manufacturing's 263,000-sq. ft. plant at Ft. Erie, Ont. (AVIATION WEEK Oct. 26, p. 7). New company, Doman-Fleet Helicopters, will produce LZ-5s from components furnished by Doman, personnel supplied by Fleet.

First production Douglas A3D—Navy's twin-jet, carrier-based attack bomber—successfully has completed its maiden flight from Los Angeles International Airport to Edwards AFB, Calif.

Bell Aircraft's XHSL-1, tandem-rotor helicopter designed for anti-submarine combat, is being produced at the company's Ft. Worth copter plant.

Substantial stock interest in Reaction Motors, Inc., Rockaway, N. J., is being sought by Mathieson Chemical Corp., Baltimore. Mathieson plans to purchase up to 50% of RMI's stock from present holders and the company at $16 per share.

Temco's Model 33 primary trainer bettered expected performance during Navy evaluation tests at Pensacola, Fla. The Dallas airframe builder says the Plebe reaches a top speed of 192 mph. and cruises at 178 mph., both faster by 7 mph. than computations indicated.

Vern C. Gorst, 77, West Coast airline pioneer, died last month in Portland, Ore. He founded Pacific Air Transport in 1928, sold the carrier two years later to Boeing Air Transport—largest of four companies subsequently joined as United Air Lines.

Myron Shook, 58, retired treasurer for Glenn L. Martin Co., was killed in an automobile accident near Modesto, Calif., Oct. 25.

Financial

Boeing Airplane Co., Seattle, last week reported net earnings of $13,576,164 for the nine-month period ended Sept. 3 from sales and other income totaling $657,435,301 compared with a net of $10,167,366 and sales of $529,468,131 a year ago. The company declared a $2.50 dividend, payable Nov. 28 to stockholders of record Nov. 12.

F-102 Leaves Convair Under Wraps

Completely covered to mask its details, the new supersonic Convair F-102 delta-wing interceptor is trucked from the San Diego factory to Edwards AFB for flight testing. The all-weather plane took off on its first flight Oct. 24, with Convair chief project test pilot Dick Johnson at the controls. No further details have been released.

Douglas Aircraft Co., Santa Monica, Calif., reports net earnings for the first nine months of 1953 climbed to a postwar record of $13,325,773 from sales totaling $632,280,525. This compared with a net of $6,757,347 and $342,722,873 in sales during the same period last year. Backlog on Aug. 31: $2,101,490,000. Douglas has declared an extra dividend of $1.50 in addition to the regular $1 payment on capital stock.

Republic Aviation Corp., Farmingdale, N. Y., made a net profit of $6,105,199 during the first three quarters of this year, compared with $4,190,111 for the nine months of 1952. Sales increased $92,856,907 to a postwar peak of $308,159,201. Backlog was estimated at approximately $1 billion.

Consolidated Vultee Aircraft Corp., San Diego, turned in a 1953 nine-month net income of $5,333,337 dropping $1,147,584 from the first three quarters of 1952 when Convair received an "extraordinary income item" of $936,514 covering a tax refund. Sales totaled approximately $285 million, compared with $274 million for last year. Unfilled orders, including contracts being negotiated: more than $1 billion. The company has declared a quarterly dividend of 45 cents a share on common stock, payable Nov. 25 to stockholders of record Nov. 13.

American Airlines net income for the first nine months of 1953 amounted to $10,987,017, compared with $9,762,759 for the comparable period of last year. Total operating revenues climbed 13% to $155,698,149.

Northwest Orient Airlines reports net income totaled $1,855,162 during the first three quarters of 1953 from operating revenues of $47,183,061, compared with 1952's nine-month net of $962,634 and $41,158,338 in revenues.

Northrop Aircraft, Hawthorne, Calif., reports a net profit of $3,360,516 for the fiscal year ended July 31, compared with $2,420,516 for the preceding 12-month period. Consolidated sales of Northrop and its Van Nuys subsidiary, Radioplane Co., totaled $184,230,018—highest on record. Backlog reached a new peak of $508 million.

International

Japan aircraft builder, Fuji Heavy Industries Co., is reported tooling up for production of Beechcraft's T-34A Mentor trainer. A spokesman says contract calls for payment of a $500,000 license fee to Beech plus royalties of $2,000 per plane for the first 350 planes manufactured during the next six years.

Fouga G.M. 170R Magister will be the standard jet trainer for the French air forces. Air Ministry has ordered approximately 100 of the 420-mph. trainers, powered by two 800-lb.-thrust Turbomeca Marbore engines.

Cubana has bought two Turbo Compound-powered Super Constellations, will take delivery from Lockheed Aircraft in 1955. Price of the transports plus spares: $3.5 million.

FAIRCHILD "Flying Boxcars" deliver supplies and equipment, conquering time and terrain for tactical airlifts. Schweizer Aircraft Corporation gives a **production assist** to Fairchild by making ailerons, rudders and trim tabs for C-119 and C-82 aircraft.

Schweizer has developed a reputation for quality standards and production ability both in sub-contract work and the manufacture of Schweizer's internationally famous sailplanes and gliders.

Perhaps we may be able to give you a production assist.

***Other SCHWEIZER Production Assists for Bell, Grumman, Republic, Link, Kaman, Stanley, etc.**

SCHWEIZER AIRCRAFT CORP.
ELMIRA, NEW YORK

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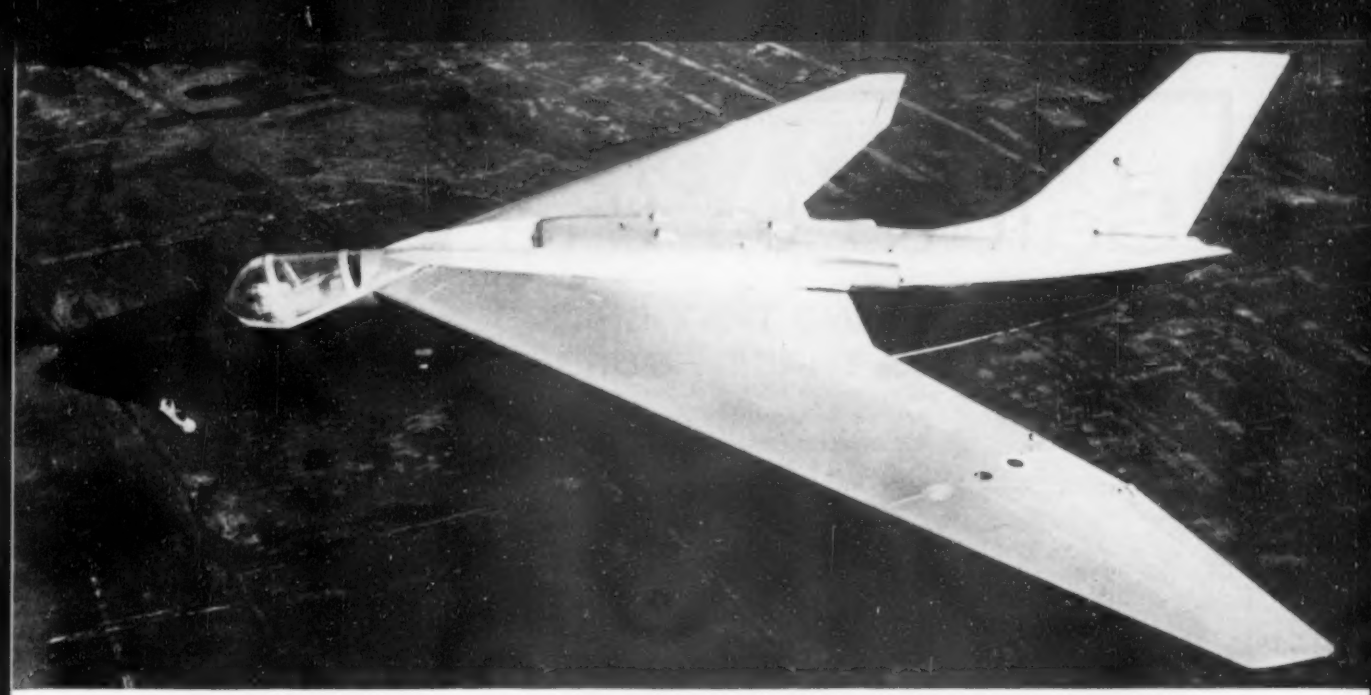
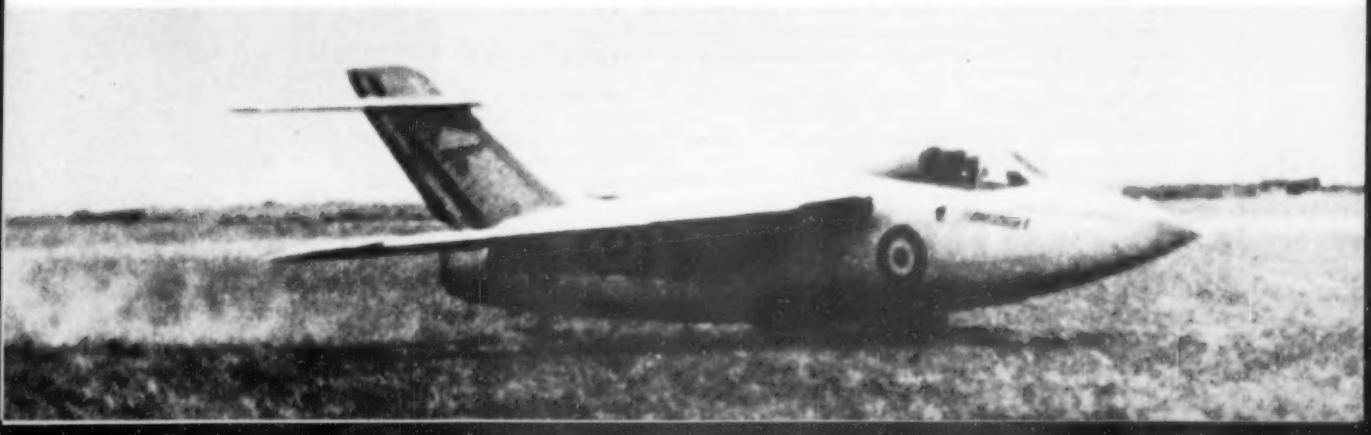


BRITISH TEST NEW WING—Closeup of the new Short Sherpa S.B. 4 research plane that is flight testing the aero-isoclinic wing configuration. The wing is devised to twist as it bends, maintaining incidence and lift at the tips. All-moving wingtips comprise one-fifth of the total wing area and serve as ailerons and elevators. Two small Turbomeca turbojets are mounted side-by-side atop the fuselage.

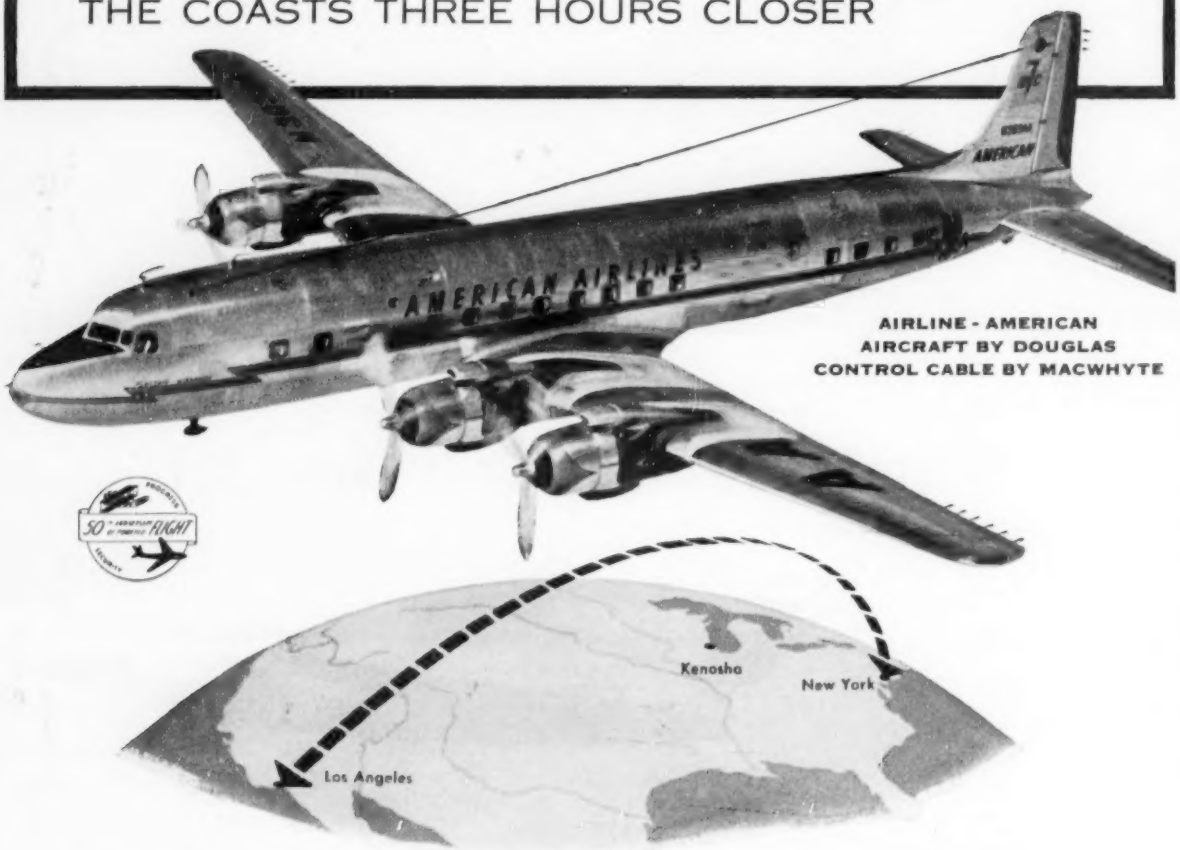
Britain, France Test New Jets



FRENCH TEST NEW LIGHT FIGHTER—The Sncase S.E. 5000 Baroudeur lightweight jet fighter is seen taking off (above) from its rocket-propelled dolly and landing (below) on a level grassy field using skids extended beneath fuselage and tail. The S.E. 5000, powered by a 6,000-lb.-thrust Sncase Atar 101, has 35-deg. swept wings. (Also see Aviation Week July 27, p. 29 for engineering story.)

Salute to the D7c

HISTORY-MAKING DC-7 BRINGS THE COASTS THREE HOURS CLOSER



AIRLINE - AMERICAN
AIRCRAFT BY DOUGLAS
CONTROL CABLE BY MACWHYTE

50 years of air achievement will be crowned by the historic nonstop coast-to-coast flight of American Airlines' new DC-7 Flagship on November 29.

Built by Douglas, the new Flagship will have a 35-mph advantage over every other piston-engined transport in the world. Powered by four 3250-horsepower "Turbo Compound" engines—cruises at 365 miles an hour. The $1,700,000 DC-7 has a range of 2480 miles, altitude range of 0–25,000 feet, and a cargo capacity of 13,980 pounds. Luxuriously appointed for passenger service, and record breaking in speed, comfort and efficiency.

AND ONCE AGAIN MACWHYTE "HI-FATIGUE" CABLE HAS BEEN CHOSEN TO OPERATE ALL CONTROLS ON HISTORY-MAKING FLAGSHIPS.

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MACWHYTE "HI-FATIGUE" CABLE

WHO'S WHERE

In the Front Office

Donald D. Webster will resign Dec. 31 as general manager of National Aeronautic Assn. to devote full time to his firm, Aero Insurance Agency in Washington, D. C. Appointment of a new general manager has not been announced.

Warren Lee Pierson, chairman of Trans World Airlines, has been elected to the board of Fruehauf Trailer Co.

E. J. Huber has resigned as vice president and director of Gyrodyne Company of America, St. James, N. Y.

J. J. Dowling, general manager of Tensolite Insulated Wire Co., Tarrytown, N. Y., has been appointed a vice president of the firm.

Berent Friele, vice president of International Basic Economy Corp., New York, has become a board member of Sandinavian Airlines System.

Changes

George E. Fouch is manager of General Electric Co.'s new jet engine department of the Aircraft Gas Turbine Division, Cincinnati. Managers of other new sections of the division: **David Cochran**, gas turbine development; **Bertram W. Mahoney**, Evendale operating; **Jack S. Parker**, small aircraft engine and aircraft accessory turbine departments.

H. E. Weihmiller, onetime vice president of Consolidated Aircraft Corp., is new design engineer for Republic Aviation Corp., Farmingdale, N. Y.

Joseph A. Anderson has been appointed general manager of the AC Spark Plug Division of General Motors, Flint, Mich.

Louis W. Davis is new director of public relations and advertising for Air Associates, Inc., Teterboro, N. J.

Dean C. Smith, former customer relations director for Hughes Aircraft Co., has joined Lear, Inc., Los Angeles, as director of customer relations.

Honors and Elections

Dr. George C. Newton, Jr., associate director of the Massachusetts Institute of Technology's servomechanisms laboratory, has won the Franklin Institute's Lewis E. Levy Medal for his paper on "Compensation of Feedback-Control Systems." **Dr. David G. C. Luck**, of RCA's David Sarnoff Research Center, has been awarded a Stuart Ballantine Medal for development of an omnidirectional radio range system.

Dr. Lyman G. Bonner, technical director of Hercules Powder Co.'s rocket development department; **Dr. Ralph F. Preckel**, research group supervisor, and **Richard Winer**, chief, rocket development dept., have received Navy's Distinguished Public Service Award for developing new guided missile propellants.

Frederick C. Durant III, president of the American Rocket Society, has been elected president of the International Astronautical Federation.

(Continued on page 66)

INDUSTRY OBSERVER

► USAF expects to pay $3.6 million apiece flyaway cost for the Boeing B-52s it will receive under the expanded production program for the multi-jet Stratofort (AVIATION WEEK Oct. 5, p. 12). This is a reduction from the $3.8-million flyaway cost figured in the initial production order for 100 bombers. USAF says if it had ordered only four B-52s, flyaway cost would have been $21 million each.

► **Douglas Aircraft will put its Tulsa plant into production on the sweptwing, twin-jet B-66 bomber as a result of a recent USAF contract for a large increase in production scheduled for this plane. The B-66 is now in production at the Douglas Long Beach plant. New order is for a special classified version of the B-66. It is scheduled to be powered by Allison J71 turbojets of about 10,000 lb. thrust.**

► Flight Refueling, Inc.'s imminent move to new quarters adjacent to Friendship International Airport reportedly was motivated by the Baltimore field's long runways (6,000 to 9,450 ft.). No airport near the company's present Danbury, Conn., plant offers such runway facilities.

► **BG Corp. is working with Wright Aeronautical Corp. on the development of a massive-electrode-type sparkplug for the Wright Turbo Compound engine.**

► Avro Canada has designed a new delta-wing fighter, the CF-105, but the Canadian government, which paid for design studies, has not decided when to go ahead with the project.

► **De Havilland Aircraft of Canada is working on a new jet trainer for the Royal Canadian Air Force.**

► Industry observers report that the stub wings recently installed on the Bristol 173 twin-engine, twin-rotor, 16-passenger helicopter contribute to about one-third of the craft's total lift at cruising speed.

► **Boeing Airplane Co. is on the verge of receiving a substantial USAF order for a tanker version of its Project 707 jet transport. Strategic Air Command is supporting a military requirement for the jet tanker to refuel Boeing B-52 Stratofort bombers. Both the jet tanker and the B-52 will use P&WA J57 turbojet engines.**

► Curtiss-Wright expects to have its propellers on six new prototype aircraft scheduled to fly next year with turboprop power. Three of the prototypes will be cargo planes, three tactical aircraft.

► **Whether air transport designs go in more for mixed coach-first-class service interiors hinges upon outcome of the International Air Transport Assn. rate conference in Honolulu this month. Present trend among foreign airlines is to expand mixed coach and first-class service. Most U. S. carriers insist a plane must be either first-class or coach, but many foreign airlines feel schedule flexibility is enhanced by a combination coach-first-class service in the same plane. International airline agreements on such controversies are decided by unanimous votes of IATA members only.**

► New flight director to simplify instrument approaches has been developed by Westinghouse Electric Corp. and is being installed in an American Airlines Convair 240 for evaluation. In addition to conventional ILS localizer and glide-slope pointers, the device has a third pointer that shows pilot how fast his plane is approaching the center of the localizer beam.

► **De Havilland Comet jet transports have now logged 10 million miles in regular passenger service with British Overseas Airways Corp. in the 17 months they have been in airline operation.**

► Royal Canadian Air Force has been making exploratory trans-Atlantic flights with its two Comet 1A jet transports. One Comet 1A covered the 2,456 mi. between Goose Bay and London in 5 hr. 35 min. while another made a Gander-Paris hop of 2,527 mi. in 5 hr. 14 min. Comets returned to Canada via Iceland.

Washington Roundup

Congressmen Turn to Aviation

Recessing congressmen are focusing their attention on aviation projects, evaluating issues and doing spadework that points to an active session next year. Some developments:

SAC vs. continental defense. The divergent positions of two congressional leaders, both defense-first-economy-second Republicans, are a strong indication that the relative emphasis to be placed on the striking air arm and air defense will be debated at the political level.

• Rep. Sterling Cole, chairman of the Joint Atomic Energy Committee, says that up to now "too much emphasis has been put on strategic bombing and not enough on interceptors and building up the home guard."

• Sen. William Knowland, Senate Majority Leader, challenged the policy of "going underground like gophers and moles." The U. S. should continue to rely on "the most powerful striking force," he says. "That is what the Russians understand and what will keep the peace."

Senate Armed Services Committee. Electronics expert Robert C. Sprague, board chairman of Sprague Electric Co., plans to complete a study of continental defense by the end of the year and present his findings to returning Senate committeemen. Although urged by Sen. Estes Kefauver, last year's Democratic presidential aspirant, to launch hearings promptly, chairman Leverett Saltonstall is putting off any action until Sprague's presentation.

Sprague reports that his study will be largely a one-man job of reporting on installations and evaluating the numerous comprehensive studies of continental defense that have been made since Lt. Col. Peter Schenk spurred the Air Force out of its 1946 position that the way to prevent war was "an overwhelming retaliatory defense." The studies: Project Charles; Project Lincoln; Project East River; Zacharias Summer (1952) Study Group.

Sen. Homer Ferguson and Sen. Ralph Flanders representing the Appropriations Committee and the Armed Services Committee, respectively, expect to leave next week on a tour of aircraft plants to check on production performance and problems. En route to the West Coast, they are scheduled to stop off at NACA's Cleveland laboratory, visiting Texas and Kansas plants on the return trip.

Senate Small Business Committee staff is looking with disfavor on USAF's plan to triple the rental on C-54s. They think it may be a hard blow to a few nonskeds, and are investigating. USAF wants to increase the average rental from $4,200 a month to $14,000. The staff reports three nonskeds—Great Lakes Airlines, Overseas National Airways, Seaboard and Western Airlines—and Flying Tiger Line rent 14 C-54s. But three scheduled lines—Pan American Airways, Northwest Airlines, Trans World Airlines—rent 23 aircraft.

127-Wing USAF?

Kansas' Sen. Frank Carlson has expressed the line of argument which the Republican congressmen will follow in supporting the Administration's 127-wing USAF program: Due to technological advances, the 127 wings planned by this Administration actually will have a stronger punch than the 143-wing force contemplated by the Truman Administration.

Democratic senators probably will counter that there have been no technological or strategic changes not taken into consideration by the Joint Chiefs of Staff in October 1951 in setting the goal of 143 wings by mid-1954.

Titanium Expansion

The Senate Strategic Metals Subcommittee (which now is headed by Nevada's Sen. George Malone), aiming to build up a record showing a market demand for titanium, has invited the presidents of all major West Coast aircraft manufacturing firms to testify Nov. 3 and Nov. 4 at Los Angeles' Statler Hotel. "Three or four" firms are ready to expand titanium production facilities, perhaps without government guarantees, once a market demand is assured, Malone reports (AVIATION WEEK Oct. 26, p. 14).

Feeders, Nonskeds

Recently chartered Small Business Administration gives faltering local service lines new hope of government financing for purchase of planes that can be operated profitably over shorthaul routes. SBA's aim is to promote small businesses in the economy—non-defense, as well as defense. It takes over functions of the now-defunct Small Defense Plants Administration, which was restricted to defense firms, and the Reconstruction Finance Corp. SBA has $50 million on hand for small business loans. Although supported by CAB, RFC refused loans to feeders. Confident that CAB will continue its support, local service lines think the new agency may be more amenable than RFC.

Justice Department's Anti-Trust Division may throw its weight behind nonskeds in their fight with scheduled airlines. New Assistant Attorney General in charge of the division, Judge Stanley Barnes, commented: "We favor competition. We are in favor of as many airlines as can meet competition and exist." The division hasn't decided on what action, if any, to take.

Air Policy Entanglements

Some progress has been made to assure that the several government groups weighing aviation policies won't be stepping on the others' toes or come forth with conflicting recommendations. But much remains to be ironed out:

Air Coordinating Committee, headed by Undersecretary for Transportation Robert Murray, will turn its recommendations on re-alignment of the functions of CAA and CAB to the Commission on Governmental Operations, under former President Herbert Hoover.

Commerce Department's transportation study, directed by Deputy Undersecretary Charles Dearing, will be coordinated with the ACC study. ACC is dealing in general policy, and the Commerce group in programs—"the stepping stones to policy." But since programs determine policy, and vice versa, there could be conflict if coordination isn't close. The Commerce group will make no "official" recommendations on reorganization.

Commission on Inter-Governmental Operations, headed by Clarence Manion, will also be working in the same area as the ACC and Commerce groups. It will go into such issues as federal vs. local financing of the airways system and airport development.

—Katherine Johnsen

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UAW's 'Opening Gun':

Wage Strike Freezes NAA Assembly Lines

- **Outcome expected to set industry-wide pattern.**
- **Union gets IAM support in new bargaining tactic.**

By William J. Coughlin

Los Angeles—Strike of 33,453 members of United Auto Workers (CIO) in California and Ohio plants of North American Aviation was described by union officials last week as the "opening gun" of an industry-wide battle for wage increases.

The walkout halted production of North American's F-100 and F-86 fighters.

Significantly, UAW and International Association of Machinists (AFL) for the first time are working closely in outlining collective bargaining strategy for the industry. (For details of this strategy and new CIO bargaining tactics, see AVIATION WEEK July 27, p. 18 and Aug. 31, p. 16).

▶ **$95-Million Cost**—The UAW, which walked out Oct. 23, demanded pay increases of 26 cents an hour to bring it up to auto-industry wage levels. Also proposed was a severance pay-pension program and other major contract revisions.

North American countered with an offer of a 4% general increase plus additional benefits, charging that the union's proposal would cost the company $95 million a year. Its own offer would cost NAA an additional $14 million annually, the firm said.

Exact wage increases offered and asked are shown in the accompanying box.

The company says the fringe benefits would total 46 cents an hour above the wage increase, but the union describes this as "much too high."

▶ **Bargaining Patterns**—The North American settlement is expected to set the pattern for bargaining throughout the industry.

The IAM—with an eye on the situation at NAA—generally was asking a 10% wage increase, three weeks vacation after five years, job review and fringe benefits.

Negotiations already were under way at a number of other plants when the NAA workers struck.

Wage Issue in NAA Strike

Here is the boxscore on the wage issue that has resulted in a strike of 33,453 union workers at North American Aviation plants:

- **Present wage rates are $1.41-2.31,** plus cost-of-living allowance of one cent, bringing spread to $1.42-2.32.
- **NAA is offering wage rates of $1.47-2.40,** plus cost-of-living allowance of three cents, bringing spread to $1.50-2.43.
- **Union is asking wage rates of $1.67-2.57,** plus cost-of-living allowance of three cents, bringing spread to $1.70-2.60.

NAA also is offering an additional four cents hourly for Grade 1 workers and an additional five cents hourly for lead men. Union is asking 25 cents for lead men.

▶ **Defense Interest**—In Washington, Defense Department indicated to National Mediation Board its interest in settlement of the strike but made it clear that neither Air Force nor Navy would take any direct part.

At mid-week, President Eisenhower had given no indication he would invoke the Taft-Hartley Law to halt the walkout as injurious to national security. But federal mediator John Fenton, who attended company-union sessions until they broke off Oct. 22, asked representatives of both sides to meet with him in Los Angeles.

▶ **Paralyzed Production**—The strike halted production of USAF's F-100, F-86F and F-86D at NAA's Inglewood, Calif. plant.

At Columbus, Ohio, assembly lines stopped turning out the F-86F and F-86H for Air Force and FJ-2, FJ-3 and AJ-2 for Navy.

Modification work on F-86s and T-6s was idled at Fresno, Calif.

▶ **'Friendly' Pickets**—Picketing was quiet at the California plants with Paul Schrade, president of Local 887, warning the workers to remain orderly and announcing that the union would not put up with any display of violence.

Although one non-striker was reported beaten at Columbus, workers reporting to the Inglewood plant were not molested by pickets.

A company spokesman described the union lines as "friendly," but North American was expected to ask for a temporary restraining order against mass picketing.

▶ **Final Offer**—J. H. Kindelberger, chairman of the board of North American, charged that "the strike called by UAW-CIO leaders against our plants is a deliberate attempt to force unreasonable costs upon production of F-86 Sabre jets and the national defense budget."

He said the company had made its final economic offer to the union.

Union demands would handicap the company hopelessly "at a time when the nation's defense budget has been drastically cut and we enter a period of tougher competition between companies for available aircraft business," Kindelberger said.

Union spokesman retorted that NAA workers deserved equal pay for work equal to that done in other industries.

▶ **Strong Backing**—North American said some 15,000 administrative and engineering personnel still were at work at Inglewood, although assembly lines had shut down.

A company report that only 200 shop employes had shown up for work indicated a strong backing of the strike among members of the bargaining unit.

The walkout included 19,000 workers here, 13,000 in Columbus and about 1,000 at Fresno, according to company and union estimates.

▶ **AFL Cooperation**—Strong support came from the once-rival IAM union.

Strike Vote

Los Angeles—John Snider, president of Local 727 of the International Association of Machinists, said last week no progress has been made in negotiations with Lockheed Aircraft Co. and that he would "definitely recommend a strike vote at our mass meeting on Nov. 1 unless we have made some progress."

This year marks the first time the two unions have worked together in aircraft industry bargaining. A joint coordinating committee was set up in Los Angeles to insure close cooperation.

Shortly after the walkout began, a delegation from the IAM, representing more than 75,000 aircraft workers on the West Coast, called at UAW here to assure strikers of their backing.

The AFL union supported the CIO's demand for auto-industry wages with assurances that their members "were of the same opinion and determination to secure the elimination of wage and fringe benefit inequities as exist between the aircraft industry and other basic industries in the USA, particularly as such inequities exist for aircraft work being done by other firms in other industries such as automotive plants."

Schrade, president of the UAW-CIO local, has declared: "It is our chance to come up to status with the auto industry, where work is similar and pay greater."

▶ **Douglas 'Hot Spot'**—This was the picture elsewhere on the West Coast as North American workers walked out:

• **Negotiations** were under way with some 28,000 IAM-AFL members at Douglas Aircraft Co.'s Santa Monica and El Segundo Divisions. Existing agreements, scheduled to expire Oct. 17, had been extended to Nov. 1. This promised to be the next hot spot. The UAW-CIO contract at Douglas-Long Beach has another six months to go.

• **Lockheed Aircraft Corp.** was negotiating with the IAM on what the company described as an "amicable basis" and with the engineers and architects union. The IAM agreement is due to expire Nov. 9. Engineers & Architects Assn., with its contract expiring Oct. 29, sought a 14-cent hourly increase.

• **Convair** was bargaining with IAM on a contract scheduled to expire at San Diego Dec. 1. Negotiations also were under way at Convair–Ft. Worth on a separate IAM contract. The company's agreement with IAM at its Pomona guided missile plant was not due to come up until next year, but talks on the EAA contract there were due in December.

• **Solar Aircraft** and Rohr Aircraft were negotiating with the IAM.

• **Ryan Aeronautical,** with contract talks not due until next summer, and Boeing Airplane Co., with recent settlements behind it, were quiet.

J44 in Missiles

U. S. guided missiles powered by Fairchild's J44 turbojet engine have been fired regularly during the past three years, according to the company. It is emphasized that today's (Nov. 2) announcement by Fairchild, made with Dept. of Defense approval, refers to "missile applications of the J44 not previously revealed that have been airborne since 1950 but remain classified in the interests of national security." Use of the Fairchild J44 as a powerplant for the Ryan Firebee pilotless aircraft was disclosed earlier this year, so the statement obviously points to other applications.

Earlier this year, an Allison Division memo, dated May-June, stated "every jet-powered missile fired in this country to date has been powered with an Allison turbojet engine" (AVIATION WEEK June 22, p 13).

Pentagon Hands-off

Department of Defense does not plan to enter the current strike negotiations at North American Aviation's three plants at Columbus, Ohio, Fresno and Los Angeles, Cailf.

Defense's "watchdog committee" in the Office of Industrial Relations, which deals with labor disputes, is letting federal mediators handle all strike negotiations. Pentagon officials feel exertion of pressure on delicate negotiations might upset the talks thus doing more harm than good.

FTL-Slick Merger Nears CAB Decision

The Flying Tiger Line-Slick Airways merger application moves nearer final Civil Aeronautics Board decision with filing of briefs to the Board Nov. 9.

The last major step will be oral arguments before CAB. Because the case concerns only domestic operation, the Board has the final decision after dispensing with petitions for reconsideration.

Opposition to the CAB examiner's initial decision, which favored the merger, were filed by: American Airlines, United Air Lines, counsel for CAB Bureau of Air Operations, Slick Airways Pilots Assn. and Air Line Pilots Assn.

PIASECKI'S GIANT YH-16 MAKES FIRST FLIGHT

USAF's big Piasecki twin-engine YH-16 Transporter, world's largest helicopter, is seen in the air for the first time during a 12-min. hop at Philadelphia International Airport, Pa., on Oct. 23. The initial public flight was made in the presence of Air Force and Army observers. The YH-16 can carry 40 troops, 32 litters or three jeeps. Fuselage is nearly 78 ft. long, overall length of the copter with rotors spinning is 134 ft. and height is 25 ft. Engines are P&WA R2180s (Aviation Week Sept. 21, p 16).

Missile Group

- **New institute sets up shop in Washington.**
- **Aircraft, avionic reps attend first meeting.**

The aircraft industry was puzzled last week by the sudden appearance in Washington of the Guided Missiles Institute, a group soliciting industry support to raise $200,000 for the organization of a missile trade association.

The Guided Missiles Institute is incorporated in Delaware and maintains offices in Suite 637 of the Woodward building in Washington which also is the office of a law firm. It lists as officers: Tad Stanwick, vice president; Dr. A. F. Murray, executive director; William T. Hannon, counsel, and Fred A. Kaske, treasurer

Stanwick is an Annapolis graduate who left the Navy this year with the rank of commander. He is now assistant to the president of the American Machine and Foundry Co. Dr. Murray is an electronics consultant and has been affiliated with the old Research and Development Board. Hannon is a member of the law firm whose offices the institute uses in Washington.

▶ **Well Attended**—The institute made its Washington debut at a meeting Oct. 23 in the Mayflower Hotel to which Washington representatives of aircraft and other firms engaged in guided missile work were invited by Stanwick to send "either the president or vice president" of the firm.

About 35 Washington representatives of aircraft and avionics firms attended. A representative of the Aircraft Industries Assn.—which last April organized its own guided missiles committee headed by James Phillips, a retired USAF general and formerly commander of the Air Research and Development Command, Cambridge Research Center, also attended. Some aircraft firms instructed their Washington representatives not to attend.

▶ **Highlights**—Among points in the discussion led by Stanwick were:

- The institute is seeking a $200,000 fund to begin operations.
- It contemplates hiring a full-time man to do legislative liaison work.
- It had approached the Army Ordnance Assn. with the idea of functioning as AOA's guided missile committee, but had been rejected.
- It had no written endorsement from the Defense Department.

At the end of a two-and-a-half-hour discussion three of the 35 present indicated their companies would be interested in backing the institute for a year. The remainder said they would consult management and report back later.

▶ **Military Interest**—After the meeting, the industry representatives were invited to a lunch at which "high Defense Department officials" were scheduled to appear. Two Navy captains and an Army colonel comprised the military brass at the lunch.

Indications last week were that aircraft firms were adopting a "wait and see" attitude toward the Guided Missiles Institute and were making an effort to get more data on its origin and its sponsors. Another meeting is scheduled Dec. 1 in Washington.

Inventory Control

Air Force, under Assistant Secretary for Management H. Lee White, is tightening up on inventory control.

First step: At Air Materiel headquarters at San Bernardino, Calif., the spares and parts inventory has been translated from an item basis to a dollar basis. The same will be done at other AMC area headquarters.

This paves the way for putting each AMC area on a stock fund basis, which would lead to smoother operations. For example, if a local depot has an unanticipated requirement for spares and parts, there must be a re-allocation of other USAF funds, sometimes impossible and at best meaning much red tape.

Under the stock fund operation, the local depot would have the money on hand to meet the requirement.

U.S. Withdraws ICAO Weather Ship Support

The United States next June will withdraw support of the 12 Atlantic weather ship stations maintained by the International Civil Aviation Organization.

United States ICAO representative Harold Jones wrote the airline organization: "The government of the U. S., as a result of a study just concluded, has determined that the services provided by the ocean stations in the North Atlantic are no longer required by the U. S. and that the benefits derived by the U. S. are no longer commensurate with the cost."

The 12 stations, served by 25 ships, have been maintained by ICAO since 1946 for weather reporting, search and rescue, communications relay and navigation aid. However, Air Transport Assn. says that U. S. airlines never have stated a requirement for the stations, have found them only a convenience.

The 15 nations supporting the operation contribute expenses in proportion to volume of their trans-Atlantic air traffic. Under the current agreement, U. S. has been operating 14 of the 25 ships.

An ICAO conference convened last July to renew the agreement, but failed to agree. Delegates were instructed to re-examine their positions for another conference next spring.

U. S. Coast Guard paid for most of the operation, with some contributions by the Weather Bureau, a Commerce Department agency.

Fairchild May Build New Dutch Transport

Interest in Fokker Aircraft's F-27 Forwarder local service transport as a replacement for the Douglas DC-3 is behind establishment by Fairchild Engine & Airplane Corp. of a wholly owned Dutch subsidiary in Amsterdam (AVIATION WEEK Oct. 5, p. 7).

Name of the new firm is Fairchild Aviation N.V.

In addition to setting up a subsidiary, Fairchild has renewed a license agreement made with Fokker last year when the U.S. firm was interested in the Dutch company's S-14 jet trainer. (AVIATION WEEK July 21, 1952, p. 19).

▶ **Turboprop Transport**—Fairchild still is interested in the trainer, although its primary attention is centered on a turboprop version of the F-27.

The plane is designed to take either two reciprocating engines or Rolls-Royce Dart turboprops. Two prototypes of the Forwarder are under construction at Amsterdam.

▶ **Designed for U.S.**—"Renewal of the agreement with the Dutch firm will make it possible for us to either buy the prototype and any other aircraft developed by Fokker or to build them in the U.S.," reports Fairchild president Richard S. Boutelle, following a European tour during which the Fokker decision was made.

He says the F-27 probably will be available to airlines in 1955.

Fairchild reveals it cooperated with Fokker on design details of the F-27 and that the aircraft is being built "around American equipment and to meet operating requirements of local service airlines."

The cockpit of the Forwarder is being laid out in cooperation with U.S. pilots.

▶ **Jet Cargo Tests**—The Fokker agreement will not affect Fairchild's research and development program—including a

jet cargo transport—or the new C-123B production contract.

Because tests on the C-123B still are continuing at Edwards Air Force Base, Calif., Fairchild officials say the assault transport probably will not be shipped to its Hagerstown, Md., plant for another month.

Meanwhile, tooling up is going ahead, and parts and tools are being shipped from the Willow Run plant of Kaiser Motors Corp., where the C-123 was to have been built before Air Force canceled the contract of Kaiser subsidiary Willys Motors, Inc., in June.

Kaiser Consolidates Avionics Facilities

Kaiser Motors Corp. last week consolidated its four electronics research and production facilities into one division under Clay P. Bedford, Kaiser vice president and president of Chase Aircraft Co.

Headquarters of the new division will be in Toledo, Ohio.

Consolidated are:

- **Kaiser's Nashua, N. J.,** facility in a leased portion of Textron Co.'s plant, where the firm currently is building the first application of the Navy's Project Tinkertoy (AVIATION WEEK Oct. 12, p. 72). to produce sonobuoys for the Navy.
- **Kaiser's Arlington, Va.,** pilot plant, where the Tinkertoy automatic factory was designed and developed.
- **Willys Motors'** (Kaiser subsidiary) electronics plant at Anderson, Ind., which now is manufacturing classified avionics equipment and television products.
- **Willys'** electronics administrative headquarters at Toledo.

Purpose of the consolidation, company officials say, is to concentrate the four facilities into a more economical unit.

John W. McGee, manager of Willys' electronics operations, will be general manager of the new Kaiser division.

New Research Center

University of Michigan's College of Engineering has dedicated a new building slated to handle classified aviation research for the government, including studies of sound transmission characteristics and methods of reducing noise, elimination of ice on aircraft, aircraft armament systems and evaluation of electronic equipment.

The new structure, containing the Engineering Research Institute, is named after Mortimer E. Cooley, dean of the College of Engineering from 1904 to 1928.

YF-100 Records

- **New speed marks will be sought this month.**
- **Little-known technicality in rules to be factor.**

North American Aviation's YF-100 Super Sabre may wrest the world speed record from the Douglas XF4D-1 Skyray this winter on a little-known technicality in Federation Aeronautique Internationale rules.

North American will make its attempt on the next series of above-90-deg. days over a new 15-km. straightaway course recently laid out over the Salton Sea in California. The Skyray set its record of 753.4 mph. over a 3-km. course. The YF-100 hit 757.75 mph. over the 3-km. course but failed to beat the Skyray mark by the required 1%.

▶ **15-Km. Try**—NAA's chance to get a 757 mph. or lower mark accepted as the world record lies in FAI rules which specify that whichever record is higher—the 15-km. or the 3-km.—will be recognized as the absolute world speed record.

Thus the YF-100 can set a new record by simply flying a faster average speed over a 15-km. course than the F4D did over the 3-km. course. This obviates any necessity to boost the Skyray mark by 1%.

This technicality was discovered by North American and confirmed by National Aeronautic Assn. officials too late to take advantage of the high temperatures prevailing when the YF-100 averaged 757 mph. over the 3-km. course.

A 15-km. course was constructed hastily at Salton Sea, scene of the 3-km. course, and last week Lt. Col. Frank K. (Pete) Everest made the initial try over the 15-km. course and averaged 751 mph. in a temperature of 79 deg.

North American expects to get another series of 90-deg. days at Salton Sea during November and has alerted all concerned so that the record attempts can be made on 24-hr. notice. Present 15-km. straightaway record of 707 mph. was set at the National Air Show in Dayton last September by Capt. Harold E. Collins, USAF, in a North American F-86D.

▶ **All-Altitude Mark**—It is expected NAA also will attempt to establish an all-altitude speed record with the YF-100.

The FAI propeller-driven aircraft record in this category is 464 mph., held by Jacqueline Cochran in a North American F-51.

No record has been established officially yet for jet aircraft. Miss Coch- 15-km. course, and facilities are available for clocking jet aircraft at altitudes up to 40,000 ft. on clear days.

With the advent of supersonic jet fighters it is expected that the main competition for speed records will shift from the current low-level runs to the all-altitude record where jet planes will have a better opportunity to demonstrate their performance.

MiG Welding

Where and why do the Russians use welding in aircraft?

A look at these welding practices is unfolded in a picture story presentation beginning on page 46 of this issue.

Information and photos are based on data gathered by Welding Engineer, a McGraw-Hill publication, and appearing in the November issue of that magazine.

Defense Sets Interim Goal of 127-Wing AF

An interim goal of 127 wings for the Air Force by fiscal year 1955, beginning next July 1, was confirmed last week by Defense Secretary Charles E. Wilson. He said the "first look" by the Joint Chiefs of Staff produced agreement on that figure.

Wilson said the current inspection tours of overseas theaters being made by each of the chiefs was a "smart move" on their part to acquaint them with the needs of the services and the budget needed to finance them next fiscal year.

Adm. Arthur Radford, chairman of the JCS, is touring European facilities, while Air Secretary Harold Talbott and USAF Chief of Staff Nathan F. Twining are inspecting French Moroccan air bases and sites of the intended Spanish bases. Gen. Matthew B. Ridgway and Adm. Robert B. Carner are heading for a tour of the Far East.

When Air Force does build to 127 wings, it can do so with its present maximum of 960,000 men, Dr. John A. Hannah, Assistant Secretary of Defense for Manpower and Personnel, who accompanied Wilson, said.

However, Wilson admitted that present strength plans still are not settled. When the Joint Chiefs return from their current tours, the final decision undoubtedly will be made, he said. At that time, they will be making their budget recommendations for fiscal 1955 for submission to Congress some time next year.

NPA Committee Report Says . . .

U.S. Can Support Bigger Buildup

Three alternate airpower programs, exceeding current defense spending, cited as within nation's capability.

Skepticism concerning the ability of the U. S. economy to stand the financial strain of a major continental air defense buildup is challenged in a report by the National Planning Assn.

Drawn by a 19-member committee headed by Ralph J. Watkins, research director, Dun & Bradstreet, Inc., the report concludes that the U. S. can sustain a $70-$75-billion-a-year defense expenditure—or $20 billion more than the current level.

"Within the limits outlined in this study—a maximum defense program of about $70-$75 billion by 1956—we believe that the decision as to the size of the defense program, under conditions short of full mobilization or major war, should be made on the basis of clear military and political strategic needs in the light of the international situation; and not on . . . assumed economic limits . . . not present."

▶ **Three Programs**—Although it will be about two years before expenditures for aircraft will start dropping, the committee estimates that the overall defense expenditure under the administration's present program will taper off from an estimated $52 billion for the current fiscal 1954 to $48 billion in fiscal 1955 and to $42 billion in fiscal 1956. (These figures include spending for atomic energy and mutual security as well as the armed services.) The committee presents three programs which it says are within the U. S.'s financial capabilities.

• **Program A** provides for a major buildup of continental air defense and would mean keeping defense spending at the current level instead of tapering it off. It would involve an additional expenditure of $1 billion in fiscal 1954, $5 billion in fiscal 1955, and $10 billion in fiscal 1956—about 90% of which would be for aircraft and electronics. The aircraft industry could take care of the additional production with existing capacity, it is estimated, but the electronics industry "would have to expand substantially." With the preparatory work required in addition to the unsolved technological problems of air defense equipment, the $16 billion proposed for the next three years is considered "the absolute maximum which usefully can be spent." Under this program, instead of dropping, total defense spending of $53 billion in fiscal 1953 would stay at this level in fiscal 1954 and 1955. It would decline to $52 billion in fiscal 1956.

• **Program B**, in addition to the air defense buildup, provides for "several Koreas." It would mean an increase in the defense outlay to $56 billion in fiscal 1954, $59 billion in fiscal 1955, and $62 billion in fiscal 1956.

• **Program C** is presented as the outside limit of defense spending the U. S. could sustain in a partial mobilization period. Expenditures under it would go from $59 billion in fiscal 1954 to $75 billion in fiscal 1956. "Actually, however," the study states, "there is a real question as to whether such an increase in expenditures could be accomplished physically. Without a great sense of urgency, the time would not be long enough to develop military plans, to do the necessary research and development work, to enter into contracts for production of materials, and to complete contracts so that such amounts of money could actually be spent. In short, it might well be impossible to spend these additional funds within three years under conditions short of a major war."

The committee included Harry Bullis, board chairman, General Mills; John Kenneth Galbraith, professor of economics, Harvard University; T. G. MacGowan, marketing research manager, Firestone Tire and Rubber Co. and H. Christian Sonne, board chairman, Amsinck, Sonne & Co.

Nonsked Blocks AF's C-54 Rent Increase

Air Force hit its first snag last week in a plan to increase rental on C-54s leased to airlines and individuals.

Overseas National Airways president, George W. Tompkins, filed an injunction in Washington's U. S. District Court against Air Force Secretary Harold Talbott to hold off the increase until ONA's lease expires Dec. 31, 1954.

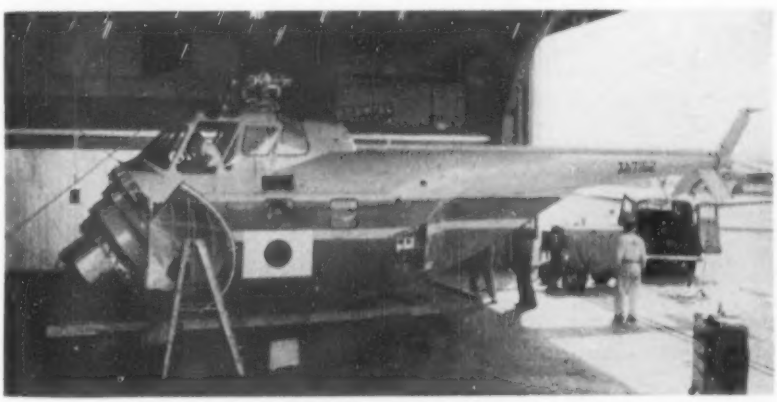
Since Overseas National first leased four C-54s June 3, 1947, the airline has paid $3,000 a month for each transport. Air Force raised the payment to $12,300 effective Nov. 1, following a review last month of C-54 leases.

Effect of such an increase, Tompkins claims in the injunction, would "confiscate" the aircraft. He claims USAF's move violates the terms of ONA's original lease.

Air Force asked ONA and other lessees Oct. 9 for a new bid to continue operation of C-54s in the Korean airlift after Nov. 1 in connection with its revised leases. Overseas National's present lease expires June 30, 1954.

ONA maintains it has been the lowest-cost operator to the Air Force, "has been ranked by the Air Force as its most efficient contractor" and was the lowest bidder this time. The airline was notified by Air Force Oct. 23 that it had been disqualified because the $9,300-per-month increase in its rental could not possibly permit the airline to be a low bidder.

ONA also claims it has spent more than $200,000 in overhauling and modernizing the four aircraft since it first leased them from the Air Force.



JAPAN GETS S-55

Japan's Maritime Safety Agency, service equivalent of our Coast Guard, will get this Sikorsky S-55 copter. Craft will be fitted with Sikorsky-developed four-wheel, twin metal-float amphibious gear, plus a winch for air-sea rescue work around Japanese islands. Open clamshell doors in nose accents accessibility to engine, which carries accessories on forward section. Atlantic Aviation is installing radio equipment on copter in its Teterboro, N. J., hangar shown here. American Trading handled the purchasing details and Dade Bros. will package craft for shipment across the Pacific to Japan.

ANG Converting to Modern Jets

San Diego, Calif.—Lt. Gen. Orval Cook, USAF deputy chief of staff for materiel, outlined a prominent role for Air National Guard in continental defense as he told delegates to the Diamond Jubilee conference of the National Guard here that all units will be 100% equipped with first- or second-line aircraft by June 1955.

Of these, about 67% will be front-line jets—including F-84s, F-86s and F-94s (AVIATION WEEK Oct. 29, p. 9), Gen. Cook said. "The National Guard is already being converted from propeller-driven equipment to jets," he told the conference.

▶ **Greater Dependence**—Pointing out that ANG's current budget is the highest in its history, Cook indicated an expanded role for the Air Guard within its present 27-wing structure.

Outlining the Air Guard's part in the event of "sudden and unannounced attack," the USAF deputy chief of staff said: "The Guard can help provide defense in depth; it can help plug gaps in the defense line, and it can back up the full-time perimeter force."

"It will be available to move in and cover areas that might be vacated by United States Air Force units ordered elsewhere." The Air Force materiel chief said the traditional concept of mobilization and preparation after D-Day is no longer valid.

"We must emphasize more and more the selective employment of our productive capability prior to any general war, for the striking power of modern weapons is so tremendous that wars today may be decided before any long-term mobilization plans can be carried out," he said.

▶ **Future Plans**—Maj. Gen. Edgar C. Erickson, chief of the National Guard Bureau, backed up Cook's outline of an expanding role for the Air Guard with a detailed report on the organization, including these future plans:

- **Conversion** of 60 squadrons to jet aircraft by next July.
- **Equipping** approximately 10 of these squadrons with two-place interceptors.
- **Allocation** of two T-33 jet trainers to each ANG squadron by the end of fiscal 1954.
- **Phasing out** of most T-6s and a large number of F-51s by July 1.
- **Increasing** personnel strength during this fiscal year to 52,500 from its present 35,556 officers and men.
- **Expansion** of technical training.
- **Continuation** of re-equipping and modernization programs to reach an equipment level of approximately 90% by the end of this fiscal year.

Gen. Erickson reported that the Air National Guard had approximately 1,000 aircraft of all types assigned at the outset of fiscal 1954.

"The program for the allocation of jet aircraft includes a sufficient number of aircraft to equip approximately 40 squadrons before the end of second quarter, fiscal year 1954," he said.

▶ **Reserve Structure**—Lt. Gen. Leon W. Johnson, commander of the Continental Air Command, reported on a review of the entire structure of the air reserve forces, made by a board appointed by Gen. Nathan F. Twining, USAF chief of staff.

Johnson said the board, which he headed, found that the Guard has a capability of immediate expansion of additional units within the present wing structure, including fighter, tactical reconnaissance, light bomb and troop carrier or cargo.

"The board believes the structure of 27 National Guard wings and 30 reserve wings should be maintained," he said.

▶ **Short Supply**—The special air advisory committee of the National Guard, in its report to the conference, complained of "the almost complete absence in the entire program of the primary weapon with which our mission is to be performed."

Aircraft are seriously short in supply and those that are assigned are obsolete, the committee said, adding: "Nor is there any indication that any relief in this matter will be provided for many, many years to come, unless some positive action is taken . . ." —WJC

SAAB SAFIR NOW SEATS FOUR

Here is the latest model of the Saab Safir, the Saab-91C which seats four. Previous Saab-91B differed mainly in having three seats. Fuel tank has been moved to the wings; earlier model had tank in the rear fuselage. The plane is powered by a 190-hp. Lycoming 0-435-A. Top speed is 171 mph., service ceiling is 20,000 ft. and range is 500 mi. Note the side-opening cockpit canopy on the new four-seater model.

EAL Crash Blamed On Early Takeoff

Factors other than mechanical failure caused the crash of an Eastern Air Lines Constellation at New York's Idlewild Airport Oct. 19 (AVIATION WEEK Oct. 26, p. 7), Lockheed Aircraft Corp. reported last week.

A Civil Aeronautics Board spokesman says preliminary evidence tends to substantiate this assertion.

Two persons were killed in the crash, the first passenger fatalities in a Connie crackup in the U.S. throughout the eight-year history of the Lockheed transport. Since the Constellation was introduced, it has traveled more than 280 million airplane miles in domestic passenger service.

The Burbank, Calif., aircraft builder reports the plane settled back on the runway as the wheels retracted, and the impact started a fire that destroyed the plane. One CAB official says the pilot probably attempted takeoff with insufficient speed.

It also is reported by Lockheed that one of the two passenger fatalities was due to heart attack, while the other passenger escaped but returned to the burning cabin and was trapped.

Airlines Need CAB Exemption to Fly Mail

Any airline can carry U. S. mail if the Civil Aeronautics Board gives it special exemption, the Post Office Department says in an amicus curiae brief to the board.

Postmaster General Arthur Summerfield offers this legal opinion but makes no recommendations in the case of several all-cargo and nonscheduled airline applicants for exemption to haul mail.

Post Office says CAB could fix the rates for such service and that the exempted carriers would have no right to subsidies under such exemption.

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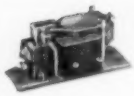

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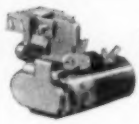

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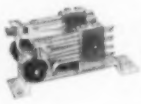

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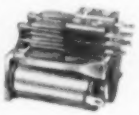

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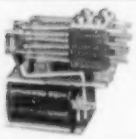

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Private Funds in Air Buildup:

Tax Benefits Spur Plant Expansion

Aviation firms, spurred by special tax amortization benefits, proposed more than $1 billion in privately financed expansion from the launching of the mobilization program in mid-1950 through last June 30, and already have been certificated for nearly $916 million for facility expansion, records of the Office of Defense Mobilization reveal.

Applications totaling $91 million were turned down; applications certificated, totaling $967 million, were reduced by $52 million. This accounts for the $143-million difference between what the industry proposed and $916 million the government certificated.

► **Largest Certificates**—But the industry's private expansion is expected to reach the $1-billion mark before the windup of mobilization. The $30-million expansion certificated from June 30 through Sept. 23 boosted the total to $946 million. Largest of the recent expansions certificated: $17.5 million to United Aircraft Corp. for the Sikorsky Aircraft Division, $3.3 million for the Pratt & Whitney Aircraft Division.

This is the picture (June 30):

• **Manufacturers of complete aircraft** proposed a $171-million expansion—$24 million more than certificated. Applications of $8 million were turned down, certifications were reduced $16 million.

• **Aircraft engine and engine parts** the total capacity to $946-million.

Breakdown of expansions authorized for manufacturers of complete aircraft, with the amount of the authorization certificated for tax amortization benefits, throughout June 30:

Private Aviation Expansion

Privately financed expansion of airframe, aircraft engine, parts and auxiliary equipment capacity through June 30 totaled nearly $916 million, according to records of the Office of Defense Mobilization. Expansion authorized through Sept. 23 boosted

Company	Expansion proposed for certification[1]	Amount certificated (000 omitted)	Amount certificated for tax amortization
McDonnell Aircraft Corp.	$20,228	$19,763	$14,593
Lockheed Aircraft Corp.	21,558	19,153	12,576
Boeing Airplane Co.	18,265	17,149	13,040
General Motors Corp. (Arlington, Tex.)	21,742	18,370	7,348
Douglas Aircraft Co.	14,457	13,360	8,564
North American Aviation	12,254	8,771	6,421
United Aircraft Corp.	10,653	8,665	6,183
Republic Aviation Corp.	8,878	8,514	5,946
Consolidated Vultee Aircraft Corp.	7,016	6,914	5,166
Piasecki Helicopter Corp.	5,519	5,391	4,043
Bell Aircraft Corp.	5,821	5,344	3,690
Northrop Aircraft	3,155	3,027	2,146
Glenn L. Martin Co.	3,006	2,745	1,745
Chase Aircraft Co.	1,915	1,868	747
Cessna Aircraft Co.	1,892	1,789	1,278
Fairchild Engine and Airplane Corp.	1,536	1,412	946
Beech Aircraft Corp.	1,409	1,380	893
Goodyear Aircraft Corp.	1,180	1,020	663
Grumman Aircraft Engineering Corp.	677	677	457
Hiller Helicopters	599	579	353
Luscombe Airplane Corp.	521	521	313
Ryan Aeronautical Co.	147	84	63
Radioplane Co.	93	42	32
American Helicopter Co.	33	31	24
Globe Corp.	19	19	12
Total, as of June 30, 1953, for manufacturers of complete aircraft, including dirigibles, gliders, etc.	**$162,543**	**$146,588**	**$97,242**
Total, as of June 30, 1953 for:			
Manufacturers of aircraft engines and engine parts	$549,256	$524,198	$369,032
Manufacturers of aircraft propellers and propeller parts	21,366	19,532	14,055
Manufacturers of aircraft parts and auxiliary equipment	234,319	225,608	153,334
Grand total as of June 30, 1953, for manufacturers of complete aircraft, engines, parts, and auxiliary equipment	**$967,484**	**$915,926**	**$633,663**

[1] This does not include applications for expansions that were denied or withdrawn.

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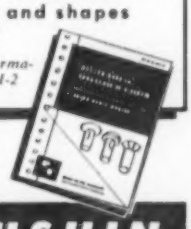

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manufacturers requested a $574-million expansion—$50 million more than certificated. Applications totaling $25 million were turned down and certificated applications were reduced $25 million.

• **Propeller and propeller parts** manufacturers asked for a $21.5-million expansion—$2 million more than the amount certificated.

• **Manufacturers of aircraft parts** and auxiliary equipment asked for a $291-million expansion—$66 million more than certificated. Applications totaling $57 million were turned down and certificated applications were reduced by $9 million.

LAI Buys DC-6Bs, Praises U.S. Liners

Los Angeles—Gen. Luigi Gallo, director of Linee Aeree Italiane, was here Oct. 15, to complete arrangements with Douglas Aircraft Co. for the purchase of three DC-6Bs.

Asked why he preferred American-built aircraft, the retired two-star general said: "The American plane is built for high efficiency and it is economical and practical."

With the addition of the DC-6Bs, the Italian carrier plans to increase its trans-Atlantic schedule from three to six, and possibly seven, daily flights.

LAI, one of two commercial airlines in Italy, operates three daily flights between Rome- Paris and New York and services Italy, Egypt, Greece, Turkey, France, Israel and Tunisia with a fleet of 20 DC-3s, four Convairs, and three DC-6s.

The airline has no immediate plans for adding jet transports.

Turboprops Top Jets For Liners: Breguet

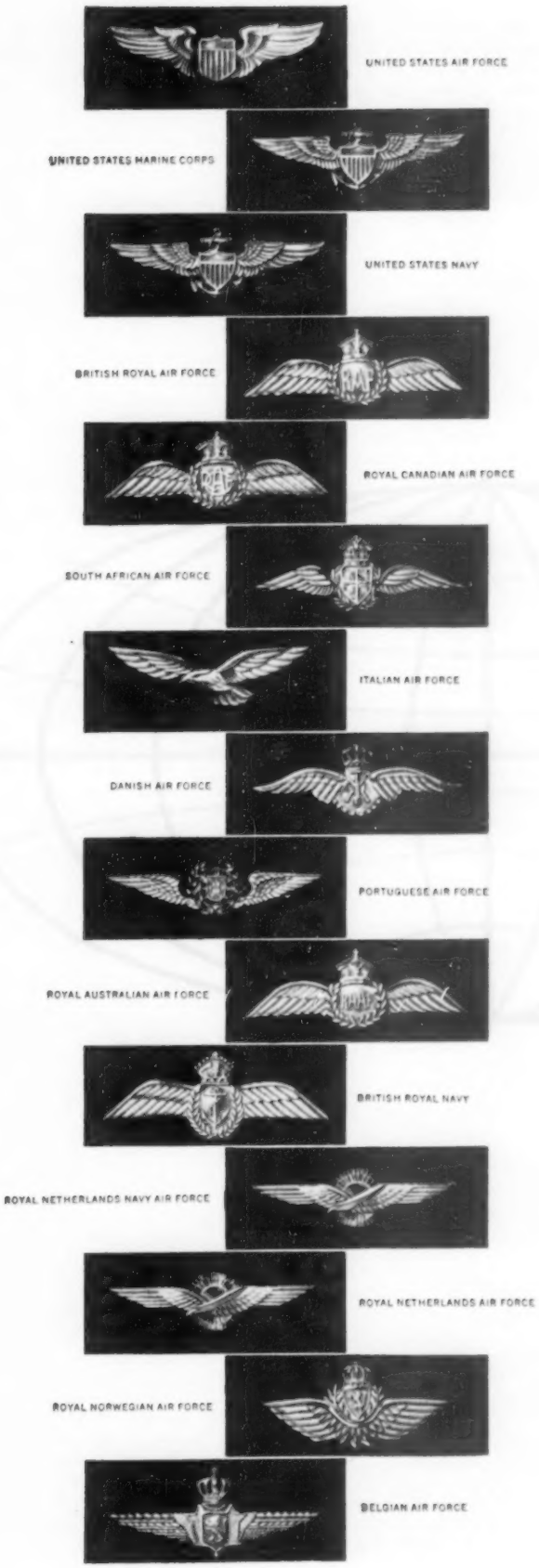
Turboprop engines cannot be expected to reach their optimum "for many, many years" but eventually will power all transport aircraft, according to Louis Breguet, pioneer French aircraft manufacturer.

During a brief visit to Washington for the International Air Pioneers dinner, Breguet told AVIATION WEEK he does not believe the jet transport has much future.

"It is not practical, at least for the present, and it is doubtful if the turbojet engine will ever be prominent in the transport picture, he says.

► **Rugged, Economical**—Breguet, who established the S. A. des Ateliers d'Aviations Louis Breguet in Paris in 1905, reasons that the turboprop is peculiarly well suited for transports because it is a more rugged and economical engine.

Future turboprops may enclose the



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propeller inside the engine, he says.

Turbojets certainly have their place in aviation, he concedes, but only in military war planes. However, Breguet is interested mainly in what he terms "aviation for peace."

▶ **Saucer-Type Copters**—A builder of planes since 1911 when his first aircraft was produced, the French pioneer says his first love is the helicopter. He is experimenting with his four-passenger, twin-contrarotating-rotor Gyroplane Type 3, powered by a 450-hp. Pratt & Whitney Wasp Junior engine.

Breguet's Gyroplane is a far cry from the copters he envisions for the future.

He describes them as huge saucer-type convertiplanes powered for tremendous speeds by a vertical turbine arrangement that would eliminate rotors. Breguet was awarded the Harmon Trophy in 1952 for his work in helicopters.

Avco Official Sells 4,000-Share Block

Sale of 4,000 common shares of Avco Mfg. Co. stock by R. S. Pruitt, vice president, secretary and general counsel, was the biggest stock transaction reported to the Securities & Exchange Commission in September.

SEC's official summary reports Pruitt's common holdings now total 21,670 shares. In the same month, Pruitt bought 200 preferred shares, making a total of 481 preferred stocks.

Other transactions:

Air Associates, Inc.: J. E. Ashman, officer and director, bought a total of 1,100 common shares in three different transactions earlier in the year, making a total common holding of 1,150 shares. Ashman also purchased 100 6% convertible preferred shares, his total holdings of that type stock. C. Kenneth Baxter, director, bought 200 6% convertible preferred shares, making a 600-share total holding.

Alaska Airlines, Inc.: Frank C. Lagrange, director, bought 100 common shares, making a total of 7,500.

Allegheny Airlines, Inc.: Leslie O. Barnes, officer and director, bought 100 common shares, making a total holding of 20,100 shares.

Aro Equipment Corp.: Ralph A. Bard, director, sold 450 common shares, leaving a total of 1,200.

Beech Aircraft Corp.: Chester C. Pearson, officer and director, bought 200 common shares, his total holdings.

Boeing Airplane Co.: Fred P. Laudan, officer and director, bought 100 common shares, making a 2,016-share holding.

Braniff Airways, Inc.: Thomas F. Ryan III, director, sold 1,000 common shares, leaving a 48,000 total.

Capital Airlines, Inc.: Arthur F. Kroeger, director, bought 500 common shares, making a total of 1,000. Raymond G. Lochiel, officer, acquired 600 common shares through exercise of rights, making a total of 4,515; in the same month he disposed of 600 options for common shares. Robert J. Wilson, officer, sold 400 common shares, leaving a total of 1,000.

Colonial Airlines, Inc.: Francis Hartley, Jr., director, bought 500 common shares, making a total holding of 1,500.

Continental Aviation & Engineering Corp.: Edward A. Hulbert, officer, sold his total holdings of 500 common shares.

Douglas Aircraft Co., Inc.: Arthur E. Raymond, officer and director, bought 500 Class A common shares, making a 1,100 total.

Flying Tiger Lines, Inc.: James E. Davidson, director, sold 500 common shares, his total holdings.

Lockheed Aircraft Corp.: Elwood R. Quesada, director, bought 100 common shares, making a 200-share holding.

National Airlines, Inc.: Salim L. Lewis, director, disposed of 500 common shares beneficially owned through a partnership,

INSIDE THE TURBO-COMPOUND SUPER CONNIE

Cutaway details accommodations of 59-passenger luxury version of Lockheed Super Constellation powered by Wright Turbo Compound engines. Note the four separate passenger cabins. From left to right the drawing shows: flight station, navigator and relief crew cabin, forward passenger compartment, forward lavatories, main passenger compartment, club lounge, main entrance and galley, coat storage, aft passenger compartment and aft lavatories. Convertible cabin design permits revamping cabin speedily to seat 99 passengers on domestic tourist service.

leaving 13,500 common shares held jointly.

Northwest Airlines: L. G. Jacques, director, bought 100 Class A common shares, his total holdings.

Seaboard & Western Airlines, Inc.: Douglas M. Amann, director, sold 200 common shares, leaving 9,030.

Western Air Lines, Inc.: C. J. J. Cox, officer, bought 300 common shares, giving him 450 total.

CAA to Break Up Jet Transport Team

Civil Aeronautics Administration's turbine-powered transport evaluation team expects to complete its assigned work by the end of the year.

Problems of certification and operation of jet airliners will be handled thereafter by the Office of Aviation Safety, CAA Administrator Fred B. Lee says.

The team was established in 1952 to devote full time to a study of problems associated with the entry of jet aircraft into the civil transportation field.

George W. Haldeman, who directed the team, will continue to monitor future CAA jet transport activities, in addition to other duties as special assistant to Safety Director A. S. Koch.

Members will continue to work on jet transport problems in the positions they previously held in the Aircraft Engineering and Air Carrier Safety Divisions of OAS.

During the past year, the team has met and discussed the various jet problems with representatives of the Aircraft Industries Assn., Air Transport Assn., Air Line Pilots Assn., individual aircraft and engine manufacturers and representatives of foreign governments.

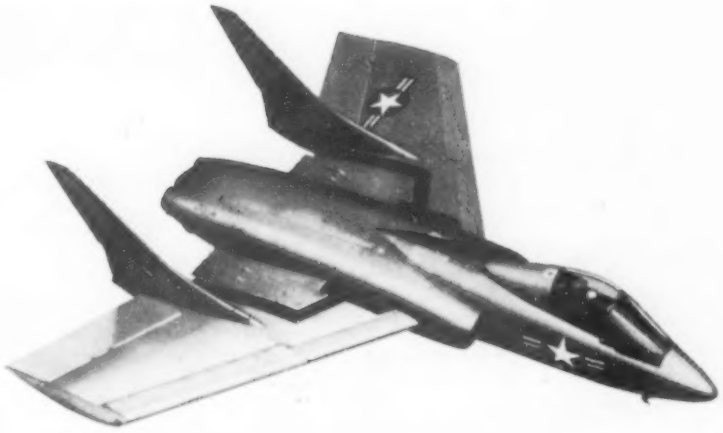
"Work of the team has been invaluable in exploring the ramifications of this new type of aircraft," Lee says. "Now that this phase is completed, it is appropriate that the work be carried on by the offices which normally handle operating and certificating matters."

Germans Buy 340s

German Lufthansa officials have signed a contract calling for initial purchase of four Convair-Liner 340s with first delivery scheduled for early next year (AVIATION WEEK July 13, p. 96). The contract contains an option for seven additional 340s.

Lufthansa plans to use the 44-passenger transports on 4,000 mi. of domestic routes touching at Hamburg, Frankfort, Dusseldorf, Munich and Cologne. Eventually the carrier will expand 340 service to major European cities.

Present at the signing of the contract in Cologne, Germany, were Convair Board Chairman John Jay Hopkins and Frank D. Sinclair, director of foreign sales. German signatories were Hans M. Bongers and Gerhardt Holtje, Lufthansa managing directors.



LESS "decktime"
MORE "airtime"
with CAMLOC Fasteners!

Chance-Vought Aircraft's twin-jet— F 7U-3 Cutlass is designed to out-fly or out-fight any other carrier-based fighter in the world.

To minimize the amount of time this fast fighter would spend on the deck for normal maintenance and service, Cutlass designers tripled the number of the aircraft's access doors and panels.

Because of their speed of operation, versatility and positive locking action, Chance-Vought engineers specified Camloc quarter-turn fasteners for over 100 of these doors and panels!

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FASTENER CORPORATION
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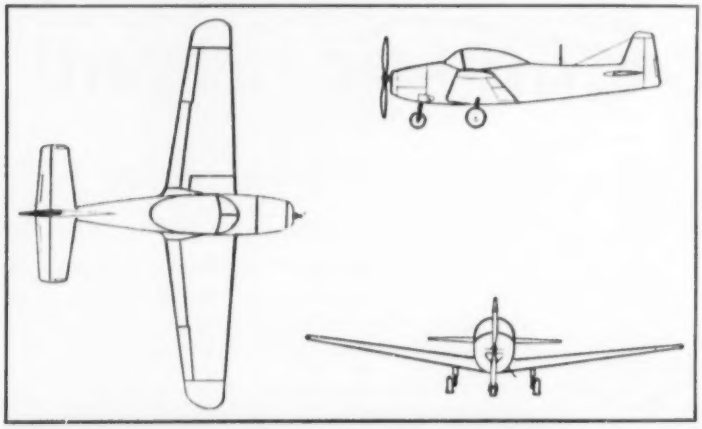
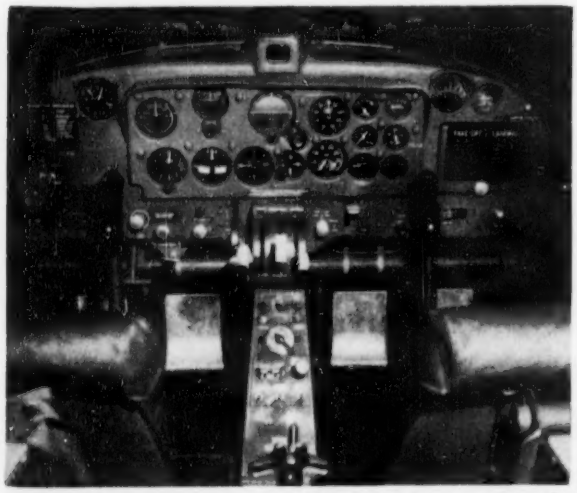
WEST COAST OFFICE: 5410 WILSHIRE BLVD., LOS ANGELES, CAL.

RYAN MODEL 72 side-by-side trainer, entered in Naval Air Training Command competition, is basically a redesign of the commercial Navion, with increased span and area, but about the same weight (Aviation Week Oct. 12, p. 24). Lycoming GO-435-C2B engine powers prototype aircraft; Continental O-470 powerplant could be installed.



Navion? No It's Ryan 72 Side-by-Side Trainer



DUAL CONTROLS show cockpit layout for side-by-side training, claimed by Ryan to have major advantages in visibility, student observation, demonstration, communication, evaluation and equipment supply.

CANOPY has two more windows than Navion, but in production version Ryan would use full bubble design. Side-by-side trainer concept has been tried and adopted by RAF, rejected by French Armee de l'Air.

A Statement

by the Originators of Grade A Greaseproof Barriers

Relative to Military Specification JAN-B-121, Amendments 1 and 2

There has been considerable misinformation and confusion as to what products qualify under Amendments 1 and 2 of Military Specification JAN-B-121.

The Specification has been amended several times for the purpose of assuring that the armed forces obtain only the highest quality materials that have proven their worth in actual field performance.

The requirements of the Amendments are clean-cut. To meet them, a greaseproof barrier must resist both natural and synthetic slushing agents for extended periods. It must be neutral and practically acid-free. It must stand up under aging tests without change.

All grades of INDUWRAP, the original Grade A, meet and exceed without qualification all of these requirements and we so certify on all shipments.

Importance of a Completely Creped Product

More than twelve years' successful usage by industry and the military has established *creped* INDUWRAP as the most satisfactory greaseproof wrap on the market. Angier's process of creping after combining kraft and acetate film, produces a material of maximum flexibility and resilience. It is easy to handle—saves time and labor. It conforms to odd-shaped objects. It gives greater cushioning protection.

To the best of our knowledge, INDUWRAP is the only structure of any Grade A, currently offered as a completely creped product, that will pass Amendments 1 and 2 of JAN-B-121.

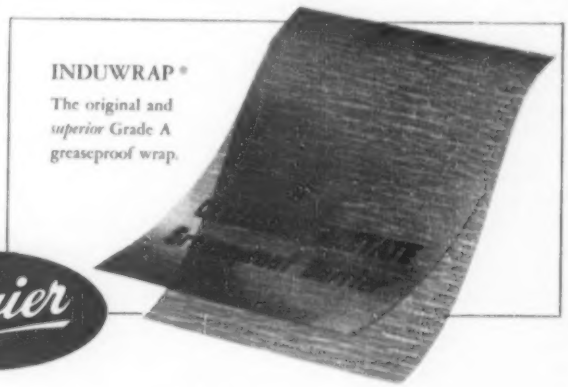
Acetate The Best Grease Barrier

Over the years, Angier's research group has spent thousands of man hours studying all commercially available films offered as greaseproof barriers. Time and time again, cellulose acetate has proved its superiority—in the laboratory and by actual field performance—for use with natural and synthetic slushing agents. There are other films in use and some of them have a very definite place in industrial packaging. But none of those now available has lived up to the "cure all" claims that have periodically been made for them. INDUWRAP'S structure of cellulose acetate, laminated to Red Kraft by an exclusive neutral adhesive, makes it the finest greaseproof wrap available today for use on slushed metal parts.

Developed by Angier during World War II to meet a new packaging requirement, INDUWRAP'S standards of excellence gained such wide acceptance that it became the basis for the original Grade A greaseproof barrier Specification. Today, though the Specification has been revised upward, INDUWRAP still exceeds requirements.

Be sure your products are properly protected. Buy INDUWRAP, the original and superior Grade A—made to do the job, not just to pass tests.

For new Induwrap data, phone Framingham 6146 or write:
ANGIER CORPORATION, Framingham 19, Mass.



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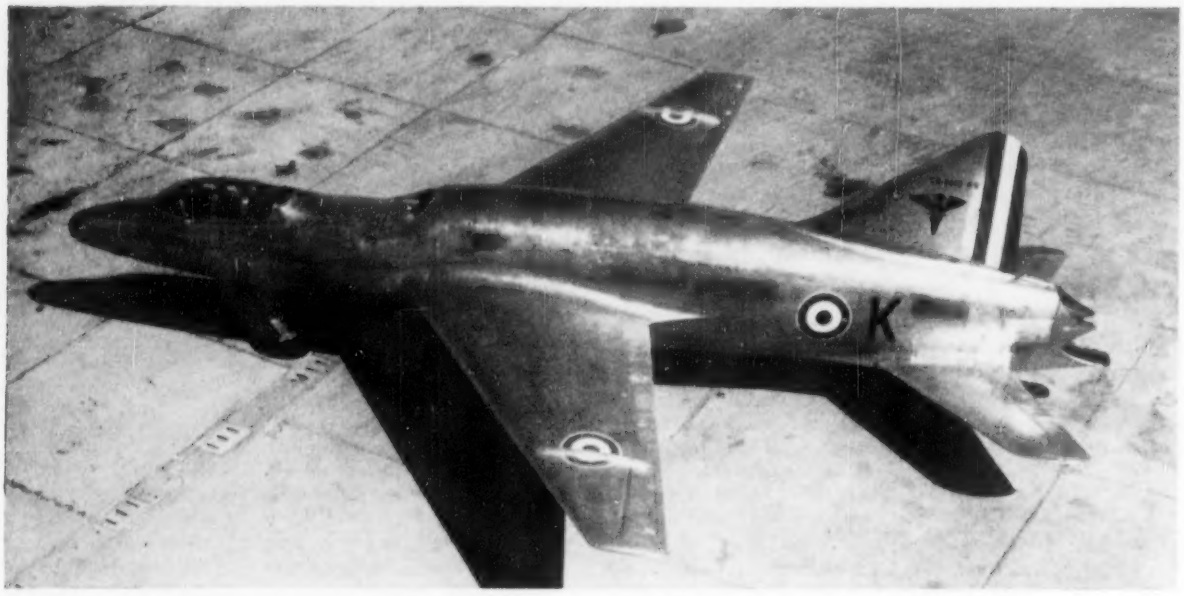


First Design Details of Sncase Grognard

French ground-attack prototype pioneered a number of features, including low-mounted horizontal tail.

France's Grognard is an interesting design study in the ground-support and attack plane category.

Built by Societe Nationale de Constructions Aeronautique de Sud-Est (Sncase), this plane might be considered as the French conception of the Martin XB-51 specification. The accompanying cutaway reveals its overall details for the first time.

▶ **Advanced Thinking**—Considering that the first prototype flew more than three years ago, the Grognard represents some quite advanced thinking for its day. Thus, one of its features—the low horizontal tail—designed to combat buffeting at high speeds, was the first used in a flying airplane. North American's F-100 is fitted with a low-placed stabilizer (see story, AVIATION WEEK Oct. 26, p. 12).

There has been no production order for the Grognard because French official thinking has changed about ground attack. Since being dropped as a service type, the two Grognard prototypes have been used for armament testing—cannon, rockets and guided missiles.

The final version, the SE-2418, first details of which are published here, combines the wing of the SE-2410 and the fuselage of the SE-2415, both experimental prototypes. Powerplants for the SE-2418 are two Hispano-Suiza Tay centrifugals, each developing 6,250 lb. thrust.

▶ **Divided Body**—The two engines are mounted one above the other, staggered, in a fuselage plenum chamber, which made it necessary to divide the body into the following unusual two-piece configuration:

• **The nose "nacelle"** houses the cockpit, cannon bay, main fuel tanks, bomb bay, landing gear and wing attach points.

• **The rear fuselage** is above and behind the nose section and incorporates the air intake duct, both engines and their tailpipes. The top of the nose nacelle sweeps clear down to the lower engine.

The plenum bulkhead runs across the fuselage at the upper engine tailpipe joint, then travels horizontally aft above the lower engine, finally down around the lower engine tailpipe near the stabilizer leading edge.

▶ **Buffeting Problems**—One of the early troubles was with boundary layer bleed from top of the fuselage. This was first exhausted through gills behind the upper intake lip, but this caused rudder buffeting. Flush outlets on each side are now used. Also, buffeting occurred in the intake duct during yaw. This was cured by fitting vertical guide vanes in the opening.

Plenum leakage at the tail is reported to have caused stabilizer buffeting. The gap could not be sealed, but the turbulence condition was improved by jet

SE-2418 Grognard

• **Dimensions**

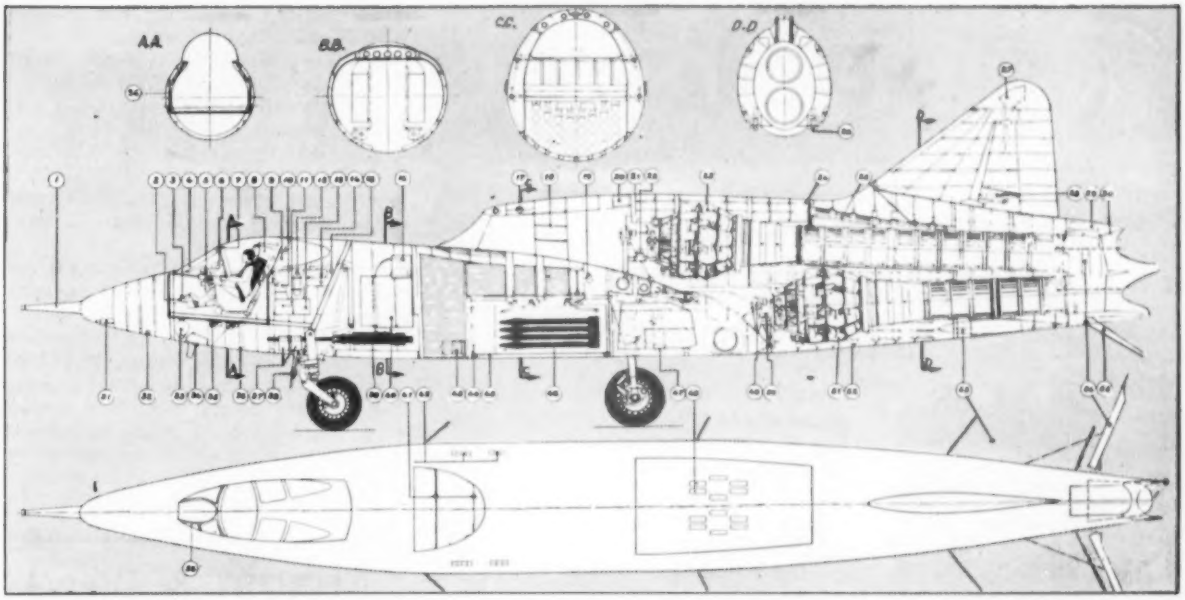
Span	44 ft. 7 in.
Length	59 ft. 6 in.
Track	10 ft. 10 in.
Wheelbase	17 ft. 2 in.
Wing area	497 sq. ft.
Aspect ratio	4

• **Weights and loadings**

Empty weight	24,800/25,000 lb.
Gross weight	40,100/40,700 lb.
Fuselage tank capacity	1,585 U. S. gal.

• **Performance**

Max. speed at 28,700 lb.	
Sea level	675 mph.
19,500 ft.	650 mph.
36,000 ft.	605 mph.
Climb	
At 39,600 lb., 545 mph.	5,600 fpm.
At 35,300 lb., 545 mph.	6,400 fpm.
At 30,900 lb., 545 mph.	7,800 fpm.
Time to 16,400 ft., at 39,600 lb.	3 min. 27 sec.
Time to 36,000 ft., at 39,600 lb.	11 min.
Service ceiling (1,000 fpm.)	38,000 ft.
Takeoff over 50 ft., still air	2,100 yd.
Landing run, still air, 26,400 lb.	1,060 yd.
Landing run with parachute	775 yd.



GROGNARD LAYOUT: 1, Flight refueling probe; 2, rudder pedals; 3, brake toe pedals; 4, bullet-proof sighting panel; 5, instrument panel; 6, reflector sight; 7, standby compass; 8, Martin-Baker ejection seat; 9, canopy jack; 10, radio; 11, VHF radio; 12, cockpit fire extinguisher; 13, VHF radio; 14, IFF; 15, oxygen; 16, main hydraulic reservoir; 17, DR compass; 18, air-intake guide plates; 19, flap jack; 20, control booster reservoir; 21, accessory gearbox; 22, flowmeter; 23, upper engine; 24, upper access panel; 25, tank supports; 26, stabilizer jack; 27, IFF and VHF flush aerials; 28, rudder booster; 29, landing parachute; 30, jet exhaust; 31, camera; 32, pressure fueling point; 33, air-conditioning turbine; 34, retractable DF aerial; 35, starting panel and cart plug; 36, armor plate; 37, batteries; 38, landing light; 39, 30-mm. cannon; 40, ammunition boxes; 41, boundary layer bleeds; 42, bleed outlets; 43, submerged fuel pump, upper engine; 44, bomb door jack; 45, bomb bay side doors; 46, rocket (32) and carrier; 47, submerged fuel pump, lower engine; 48, plenum chamber doors; 49, accessory gearbox; 50, flowmeter; 51, lower engine; 52, lower access panel; 53, stabilizer; 54, air brake, side; 55, air brake, bottom; 56, direct-vision panel.

outlet extension plates, which also served to reduce interference between exhausts.

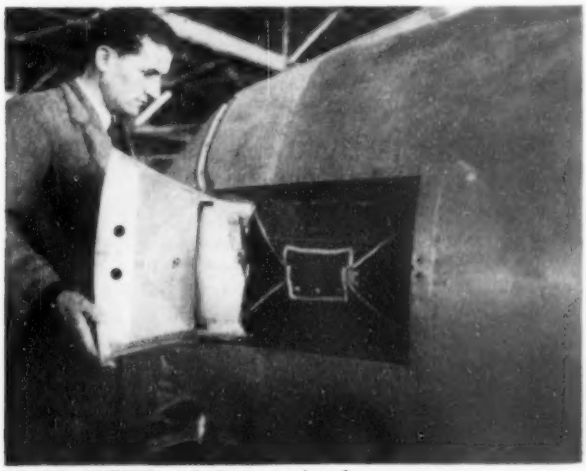
Tight fuselage space imposed by the use of a thin wing prompted the risky expedient of fitting tanks around the upper jet pipe.

► **Armrest Controls**—Cockpit is unpressurized because of the plane's ground attack role, and this lack prevented diversion of the aircraft for other duties when the Air Force decided it did not need the Grognard for this role. The cabin is protected by about 900 lb. of armor plate.

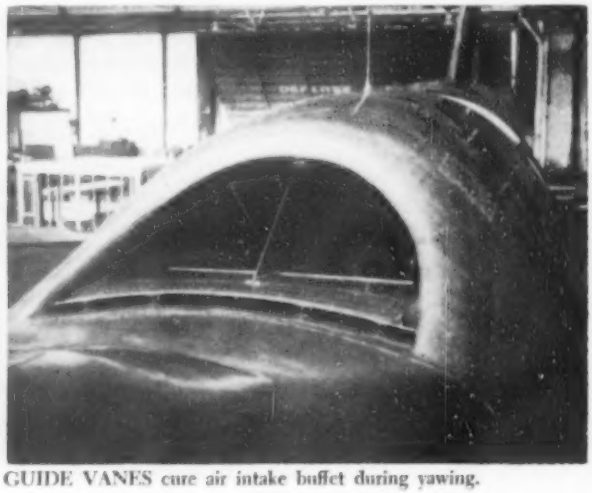
The control stick is replaced by moveable armrests. This Lecarme-Satre arrangement (AVIATION WEEK Jan. 14, 1952, p. 33) has proven acceptable to all pilots. The armrests have handgrips —one-up, one-down movement deflects the ailerons, while backward and forward motion operates the elevator.

► **Wing Makeup**—The wing structure consists of an I-beam for bending, at about 25% chord, with chordwise ribs and skin for torsion. A cross-beam through the fuselage at right angles to the centerline ties the beams together and transmits torsion between the planes.

A light rear beam carries the extension flaps and is attached to the fuselage by a ball-and-socket fitting. Two-piece ailerons have inverse taper. They are set at an angle to the wing beam to reduce twisting. Leading edge of the wing is drooped for takeoff and landing. Fences added at the inboard end of the



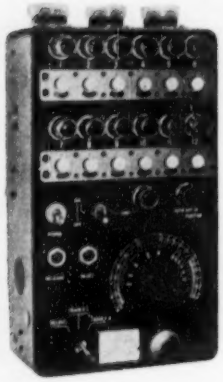
BRAKE CHUTE pack fits in starboard compartment.



GUIDE VANES cure air intake buffet during yawing.

NEWMATICS

RHODES LEWIS ELECTRICAL CONTROL BOXES CUSTOM MADE TO YOUR SPECIFICATIONS



Electrical control box units centralize and coordinate the management of remote equipment. Rhodes Lewis specializes in the design of compact light-weight control box units that require minimum installation effort. Typical innovations of Rhodes Lewis designs include: Edge-lighting for panel illumination without additional light source; intervalometer for continuous impulsing with a variable time interval of 7 to 120 seconds.

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Pneumatic Ejection Systems	X	X	

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ailerons start at the wing beam because of the airfoil's droop snoot.

Wing profile is NACA 65212. Sweep is 42 deg. 7 min. at 25% chord.

Horizontal stabilizer is placed low, a position much favored by French engineers. It has given no trouble at high or low speed, but is vulnerable to armament debris. Adjustable for trim, the stabilizer has 35 deg. 32 min. sweep at 25% chord.

► **Armament**—Two 30-mm. cannon are housed in the fuselage bottom, with magazine holding 400 rounds.

A fuselage bay can accommodate alternately 32 60-lb. rockets, 16 143-lb. rockets, 200 9-lb. air-to-ground rockets, four 550-lb. bombs, two 750-lb. bombs or four 770-lb. napalm containers. Another scheme will accommodate two 1,000-lb. bombs or two Matra air-to-air 1,764-lb. guided missiles.—**JHS.**

THRUST & DRAG

Induced Drag Coefficient of the Week goes to the unidentified Army major who, according to the McDonnell plant newspaper, addressed a new group of 150 graduate engineer recruits: "I don't think any more of you young college punks than I would 150 broomsticks." The occasion was the welcome to service of the First Ordnance Guided Missile Support Battalion assigned to the Army's guided missile work at the White Sands Proving Ground, N. M. Seven of the "broomsticks" are now holding responsible positions with McDonnell. The Army is still trying to get officers and men to stay on and work in scientific jobs in uniform.

* * *

Once upon a time there was an engineer who was asked to design a gimmick. It have to have motion in several directions and be adjustable. It belonged with some expendable ground-handling equipment on a military airplane.

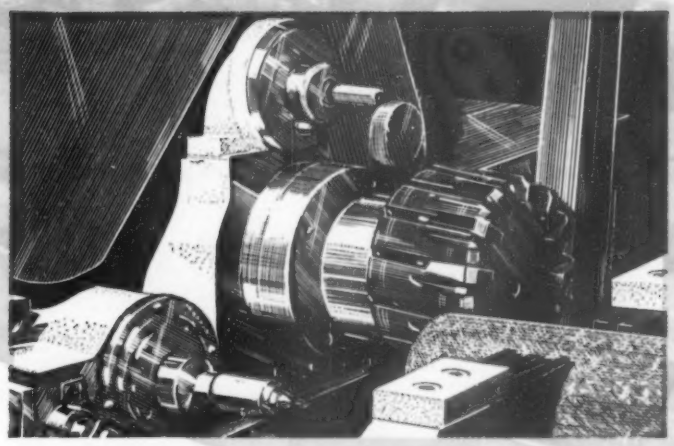
So the engineer figured that a cheap, rugged item was needed and he dreamed one up. It was made out of a few standard house-plumbing fittings which could be brought at any hardware store. Total cost, including assembly time and the fittings, was about $10.

He took the design and the model to his group leader, who opined that it couldn't be used. Why not, said the engineer? It'll rust, said the GL. So paint it, said the engineer. Paint'll chip off, said the GL. So plate it, said the engineer. Still don't like it, but we'll try it, said the GL.

So they tried it and it worked. The next thing was to order some.

What's the spec number, asked the contracts supervisor. Whaddayamean,

OK end mills rough-mill forged steel propeller shaft ends for world's most powerful piston aircraft engine



TWO OK END MILLS, ON A SUNDSTRAND COMBINATION CUT OFF AND CENTERING MACHINE, ROUGH-MILL THE ENDS OF TOUGH STEEL PROP SHAFT FORGING FOR A PRATT & WHITNEY AIRCRAFT WASP MAJOR PISTON ENGINE

IN the building of this mighty engine, there are hundreds of milling operations that must be done to dimensional tolerances unknown in other industries. Meeting these close tolerances is no difficulty when your machines are in top condition and you use OK milling cutters. OK cutters are popular because of their powerful bodies, and simple, streamline designs.

Size for size, they have more beef in the body, more metal backing each blade. No metal is cut out to make room for locks, blocks, screws, gibs, or other blade holding devices. Blades once set, stay secure without tipping or slipping. More blades are carried for finishing cuts, and heavier blades for roughing cuts.

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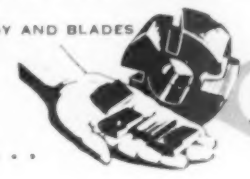

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said the engineer. I mean I gotta have a spec number or we can't order it, said the contracts man. So write your own spec, and specify standard plumbing fittings, said the engineer. Can't do it, said the contracts man, but maybe we can find a spec under barracks plumbing.

So he looked and it didn't come under any such listing as *Trap, sink, brass, chrome-plated.* Nor was it under any other listing. So because it didn't fit any spec, and because he couldn't write his own spec, the contracts man couldn't order parts.

It would be a pleasure to tell you taxpayers that the service has seen fit to modify an aircraft spec so that *Fittings, plumbing, standard, house* can be used in aircraft equipment and thus save a lot of money. But as it now stands, the engineer rues the day he ever suggested anything cheap and simple.

Meantime, the draftsman on the next board is working out a monstrous chrome-plated stainless-steel gismo with wheels, cranks, gears and screwjacks which will do the same job, only more expensively.—DAA

Flame Analyzer Tells Rocket Efficiency

Temperature distribution in a rocket flame can be determined by a new gage developed at the General Electric Research Laboratory by Drs. Herbert M. Strong and Francis P. Bundy. Study of the flame helps technicians determine the efficiency of the rocket motor and tell how much energy is being converted into thrust.

Based on the use of a sodium-vapor lamp as a standard for comparison, the gage uses an interferometer instead of the more-commonly tried prism spectroscope. The interferometer magnifies the radiation spectrum coming from the lamp for more detailed analysis.

Strong says that the gage can be used to survey the temperature structure in a large section of a flame, in contrast to earlier methods which permitted temperature measurements at one point only.

New Plant for F-100

A new, windowless, concrete structure for F-100 fuselage assembly operations is nearing completion in Los Angeles.

This North American Aviation facility will contain 126,000 sq. ft. of floor space and 150,000 sq. ft. of paved yard. A ventilating system will give four complete changes of air per hour.

The new building incorporates precast wall construction. Three of the wall sections have hangar-type door openings 58 ft. wide and 18 ft. high.

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AMPLIFIER GROUP, TYPE 16-31C—provides 28 contact stabilized operational amplifiers for use as summers, differentiators, integrators, and inverters. Also in the cabinet are all necessary power supplies and a complete test panel.

MULTIPLIER GROUP, TYPE 16-31L—is a servo-mechanical multiplier and incremental function generator. There are 20 channels, each of which is capable of multiplying four variables by a fifth.

RESOLVER GROUP, TYPE 16-31D—furnishes 4 resolving channels and 12 operational amplifiers. Each resolving channel may also be used for multiplying three variables by a fourth. Furnished complete with test panel, reference supplies, and power supplies.

CONTROL CONSOLE, TYPE 16-24E—Houses the grounded metal problem board and its bay, attenuators, initial condition potentiometers, networks, limiters, and all operating controls.

SERVO GROUP, TYPE 16-31P—For the operations of resolving and multiplying when used with external amplifiers. There are two resolving and four servo-multiplying channels. The equipment is furnished with test panel and power supplies.

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U.S.-U.K. Engineers Trade Ideas

London—The Fourth Anglo-American Aeronautical Conference, held here during mid-September, re-emphasized the belief of many technicians that such conferences are most valuable for providing the excuse to meet informally.

The problem of security directly forced a withdrawal of a paper on delta-winged aircraft by S. D. Davies, Avro's chief designer and indirectly influenced the discussion periods which followed each lecture.

One top British engineer, explaining what he termed his "weak rejoinder" to George Schairer's presentation on the pod mounting of jet engines (AVIATION WEEK Sept. 28, p. 19), said that he knew what was wrong with the pods, but couldn't say so in an open meeting. "George knows that I know," he added, "and he also knows what's wrong with British bombers, and he couldn't say so."

Said another top engineer: "Security is one of the things we've got to live with. So we tailor our lectures and our discussions to fit. Then we arrange private conferences and really talk."

The dozen lectures covered the range of contemporary aircraft problems in aerodynamics, powerplants, structures, production and operations. Schairer's lecture and the discussion it inspired has been reported in an earlier issue of AVIATION WEEK; the following paragraphs summarize the remaining lectures of the three-day session.

Structures for Highspeed Aircraft

H. L. Hibbard, Vice President Engineering, and J. F. McBrearty, Chief Structures Engineer, California Division, Lockheed Aircraft Corp.

Airframe structure must be just the amount that is necessary and sufficient to do the job; otherwise, the penalties paid in performance and growth increase are severe.

Today, temperature effects are beginning to have tremendous influence on aircraft design. Aerodynamic heating is well understood now, but thermal radiation from the detonation of nuclear weapons may be important as a design consideration.

Design data on high-temperature properties are available "in gratifying quantity," and design principles to eliminate or reduce structure distortion due to thermal effects are being developed. But theoretical means for predicting temperature effects accurately are still needed badly.

On nuclear-powered aircraft, there will be at least two new criteria for assessing materials:

- **Damage due to radiation.**
- **Radioactivity of the material** itself after exposure to radiation.

There will also be at least four new design considerations:

- **Special accessibility** built into the structure.
- **No bending-moment relief** by fuel loads in the wing.
- **Dynamic vertical bending** response of the fuselage to gusts because of the weight concentration of shielding in the fuselage.
- **No weight saving** in landing gear because of the insignificant difference in takeoff and landing gross weights.

Fatigue is still a problem, and has not lent itself to theoretical prediction. Perhaps a fatigue meter, consisting of a package of prestressed test coupons with graded concentrations of stress, could

The Introduction of the Comet Into Service

A. C. Campbell Orde, Operations Development Director, British Overseas Airways Corp.

The original Comet design was considerably different from the version finally bought by BOAC. Almost seven years elapsed between the time de Havilland submitted its original proposal and the time the Comet went into service (see sketch, below).

The first year of Comet operations has been considered highly promising, and the plane's inherent advantages in passenger service have been demonstrated. Higher operating speeds have given a greater consistency of performance on schedule.

Reduced flight times have re-emphasized the problems of navigating aids, communications and ground organizations.

The highspeed aircraft typified by the turbojet type is relatively inflexible in route application, both economically and operationally.

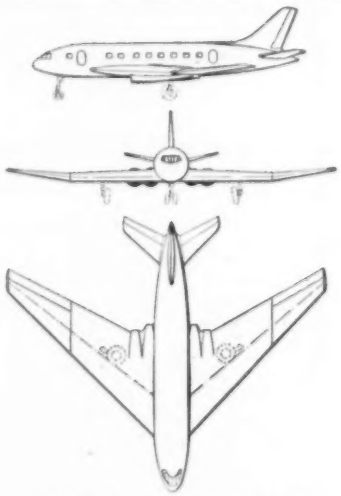
Under-utilization is more difficult to avoid than with slower types, and is considerably more costly.

The operator's requirements must be precisely defined because correct size of aircraft for the job and the powerplant are critically interdependent.

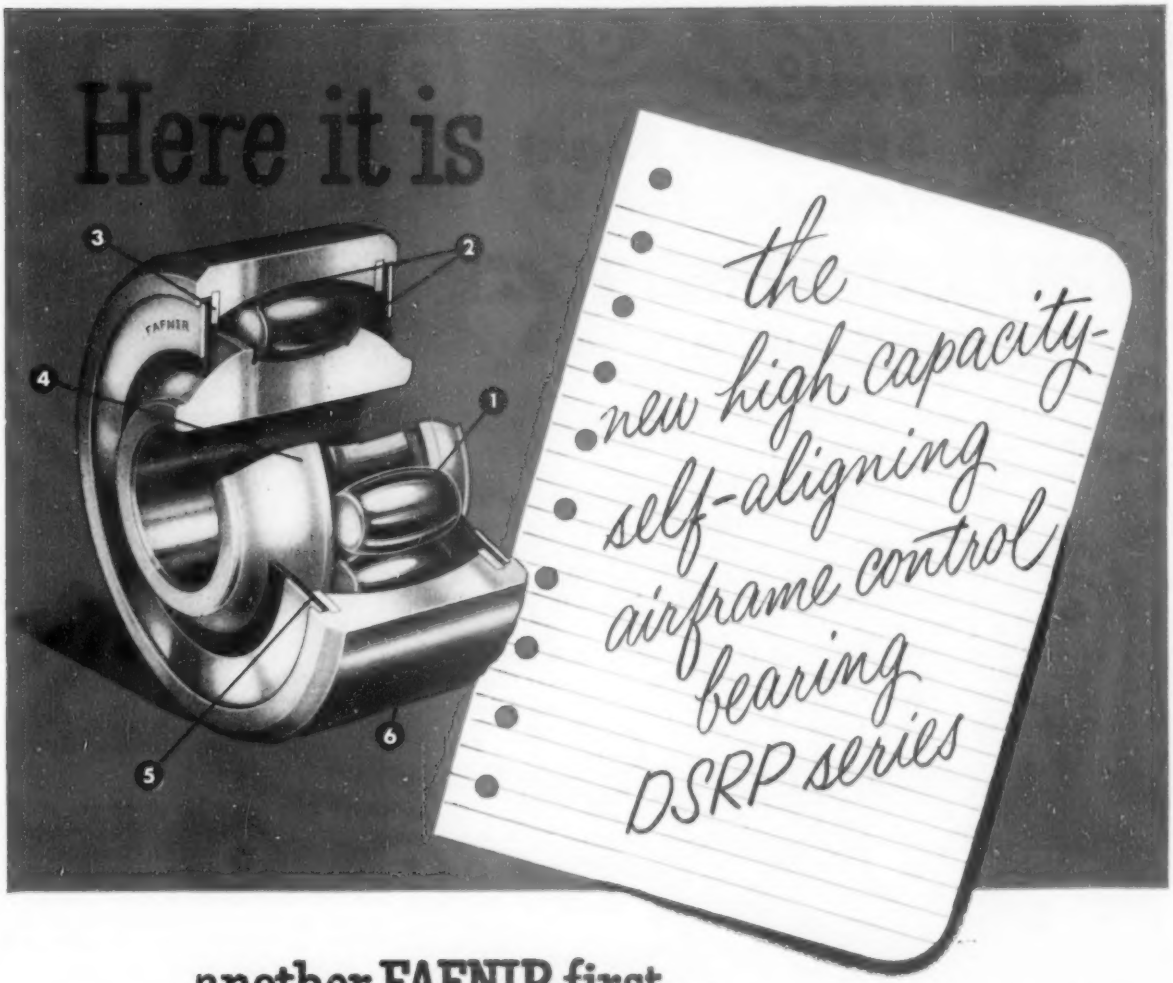
The development of navigational aids and other operational facilities lags far behind that of the aircraft; so any conclusions as to the most suitable form of jet airplane for airline use should be modified by the current route conditions.

Comet Development

	May 1946 (Original order)	Nov. 1946 (Revised design)	Spring 1952 (Delivery to BOAC)
Span, ft.	96.6	115	115
Wing thickness/chord ratio, %	1,677	2,015	2,015
Sweep, deg.	40	20	20
Wing thickness/chord ratio, %	11	11.5	11
Overall length, ft.	80	93	93
Overall height, ft.	24.75	27.8	29
Fuselage inside dia., ft.	9.5	9.75	9.75
Passenger capacity	24	32	36
Payload, lb.	7,500	10,000	11,100
Max. payload, lb.	7,500	10,000	11,800
Fuel capacity, U. S. gal	7,200	6,760	7,160
Engine thrust, lb.	5,000	5,000	5,000
Cruise Mach no.	0.87	—	0.74
Max. permissible V_e mph.	535	505	485
Max. gross weight, lb.	93,000	100,000	105,000



Original Comet Design Proposal



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3. Hardened back-up rings provide positive shoulder stops at extreme misalignment.
4. Close-fitting inner ring side flanges insure superior roll alignment.
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6. One piece inner and outer rings.

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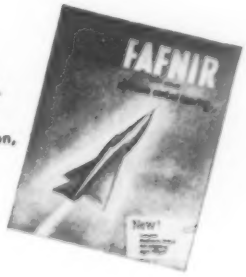

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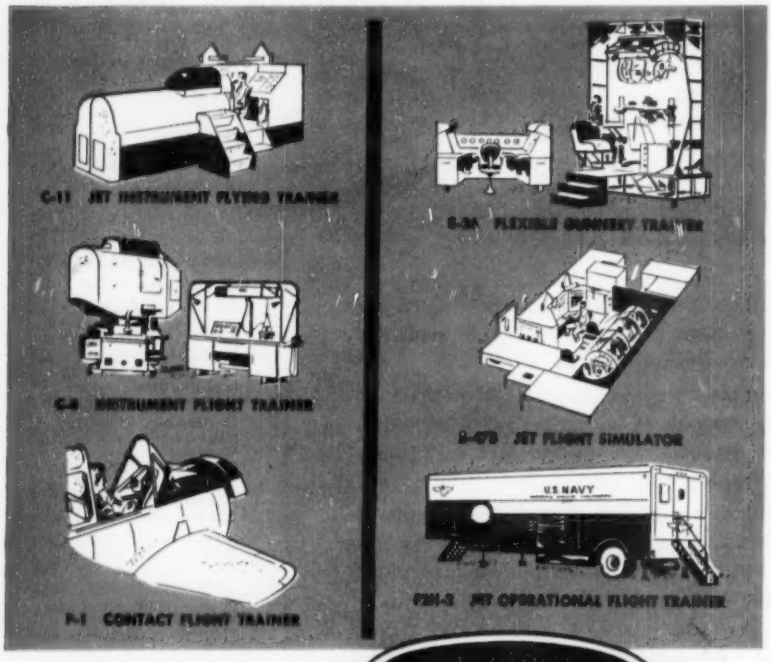
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be used to give warning of trouble.

Extra stiffness to cope with dynamic phenomena or damping devices to suppress them will mean more structural weight; this will be more important for large aircraft than for fighters or missiles.

Structural methods were explained by charts of utilizations and trends in stress analysis work. Computing techniques, flight-test measurements including rocket model tests and structural test labs have done much to speed up the vast amounts of stress analysis required today.

New materials–78ST aluminum alloy, high-heat-treat steel at around 280,000 psi., titanium and plastics–were considered briefly.

Speculation on future materials suggests the possibility of a steel with strength of 29 million psi. compared to the highest current levels for drawn wire of about 460,000 psi. This extreme strength would depend on complete understanding of the atomic binding strength in the material.

Structural Adhesives for Metal Aircraft

N. A. de Bruyne, Managing Director, Aero Research Ltd.

After citing the advantages of adhesive bonding and referring to specific examples, de Bruyne compares the strength of bonded honeycomb panels to the strength of optimum aluminum-alloy skin panels. His figures show considerable strength improvement when honeycomb structures are used.

De Bruyne comments that there is not the same confidence in adhesives in the United States as in Great Britain. He points out the difference between U.S. and British production techniques for adhesive bonding: The British prefer the hydraulic press, while the U.S. manufacturers like the vacuum blanket or autoclave process.

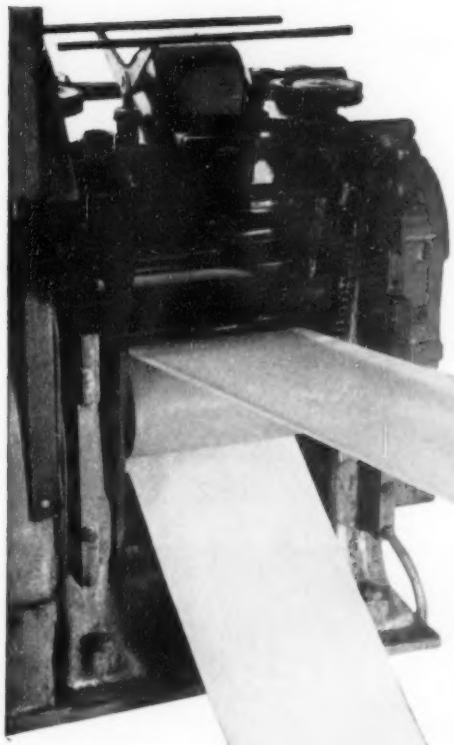
De Bruyne favors the hydraulic press, and says that as a fast production tool it seems unrivaled.

Powerplants for Rotary-Wing Aircraft

A. Graham Forsyth, Chief Helicopter Engineer, Fairey Aviation Co. Ltd.

With only one engine–the Alvis Leonides–available in Britain for helicopter use, Forsyth prefers to consider future possibilities in the hope that something will be done to improve the helicopter powerplant position.

A flat 12-cylinder engine is proposed first as being the ideal copter powerplant. Rated at 1,000 brake horsepower, with a one-hour power rating of 850, the engine should weigh about



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The elaborate cooling systems required when organic rubber rolls were used, are eliminated entirely. The heated roll preheats the paper, too, giving a better bond between the paper and the coating. If the web breaks, spilled plastic can be simply peeled off the Silastic, where organic rubber rolls had to be ground down.

Indications are that Silastic rolls may also prove useful in extrusion laminating coaters, as festooning rolls in curing ovens, and in other coating applications requiring resilience and easy release at high temperatures.

Silastic is also characterized by stability at temperatures far below the limits of any other kind of rubbery material, very low water absorption, good dielectric properties and high physical strength at high operating temperatures. Resistant to weathering, oxidation and to a variety of hot oils and chemicals, Silastic remains resilient long after organic rubbers stiffen or melt. When you need rubbery properties under severe operating conditions, ***Specify Silastic.***

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Forsyth is sold on the jet-driven rotor, and deals with three basic systems of providing the drive:

- **Burning fuel** in a power unit on a blade.
- **Generating gas outside** the rotor and releasing it to drive the rotor.
- **Combination** of these two schemes.

Of all the possible schemes, the pressure-jet idea shows advantages where the copter has to have reasonable forward speed and has to take off at heavy loads. A group of proposed powerplant combinations was shown, including the drive for the Fairey Gyrodyne, due to fly shortly.

For large copters, the jet-driven rotor also appears to be the solution because of the complications of gears, clutches and shafts required to cope with 7,000 to 15,000 hp. and large rotor diameters.

The Aerodynamics of Compressor Blade Vibration

H. Pearson, Chief Research Engineer, Rolls-Royce Ltd., Derby.

Pearson reviews the flutter problem mathematically from the viewpoint of the turbine designer, and not the wing flutter expert.

He concludes that in unstalled regions, the damping is almost entirely aerodynamic, even when excitation is aerodynamic, such as from the wake downstream of an inlet vane.

When the wake is present, the vibration may be assessed by equating aerodynamic excitation and damping, because other damping is negligible. This can give a simple expression for the stress in a blade.

Wakes die out rapidly and shouldn't affect blades beyond the second stage or so downstream of the wake.

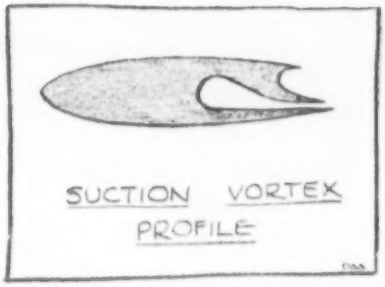
One prime cause of blade failure is one-dimensional flutter when the stage is stalled in a high-pressure-ratio compressor. A small amount of built-in damping would probably eliminate this cause of failure.

More work on cascades and rotating stages is needed in connection with stalled flutter, to investigate the flutter boundaries with variations in blade stiffness and damping.

Some Recent Advances in Boundary Layer and Circulation Control

Courtland D. Perkins, Professor, and David C. Hazen, Assistant Professor, Dept. of Aeronautical Engineering, Princeton University.

The use of suction at the trailing edge of an airfoil has been investigated at Princeton, with most of the work restricted to determination of two-dimensional characteristics.



This work led directly to a new means to create and stabilize a vortex at any desired location. There has been such severe turbulence created in the throat of the test windtunnel by diffuser stall that it was unsafe to operate the tunnel. So the Princeton scientists rebuilt the diffuser, which had a considerable increase in cross-section area at its end. After some development, a cusped shape was evolved for the transition between the areas, and this worked. Power losses vanished.

The next step in the program was to design a trailing edge control to trap a vortex; the developed shape—a suction vortex profile—was not considered seriously as a wing shape, but was simply a laboratory expedient.

The most notable feature of the flow is the way the vortex affects the pattern of the downwash. It has been possible in one extreme example to make the flow adhere to the profile at an angle of attack of 120 deg.

The authors feel that the use of the trapped vortex represents a major advance in circulation control and is a means by which very high lift coefficients may be obtained.

The Control of Flight

Preston R. Bassett, President, Sperry Gyroscope Corp.

One big difficulty in standardizing instrument flight has been the pilot, because he is the most flexible and adaptable servomechanism conceivable. He can make almost anything work, and so there is no clear-cut "best way" to achieve instrument flight.

Bassett reviews the whole development of instrument flying, starting with the first instrument—a tachometer—which furnished the only information that could not be acquired through normal human sensing.

Instrument flying really began in the decade following the first World War, with the development of the gyroscopic turn indicator by E. A. Sperry. In 1933 the Dept. of Commerce permitted airlines to fly passengers under instrument conditions for the first time. The same year saw the successful use of an auto-

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In 1946 the problem of instrument approaches still was unsolved, but recently Sperry's solution has been the Zero Reader.

The outstanding contribution to instrument flight during 1953 was the standardization of a flight instrument panel by a special committee set up by the Society of Automotive Engineers. This has been approved by the air transport industry and the Civil Aeronautics Board and endorsed by the military. It took 50 years, says Bassett; the first 25 were to accumulate enough instruments to create the problem and the second 25 years to standardize on a solution.

Aircraft De-Icing by Thermal Methods

J. L. Orr, D. Fraser and J. H. Milsum, Low Temperature Laboratory, National Aeronautical Establishment of Canada.

The authors present the case for de-icing on the basic premise that less energy is required to melt the bond between ice and surface than is required to keep the surface continually heated and thus clear.

Experimental work has been done in windtunnels of the Low Temperature Laboratory and in flight using the "Rockcliffe Ice Wagon," a special Canadair-built North Star (Douglas DC-4 with Rolls-Royce Merlin engines). Thermal de-icing has been successfully applied to propellers and wings and is now being tried for helicopter rotors.

A typical turboprop transport aircraft is used as the design problem for the comparison of two systems of anti-icing and de-icing. As a final result, the authors state that the thermal energy requirements for an electrical de-icing system might be from one-eighth to 1/80 of those for the hot gas anti-icing system.

Basic Prerequisites for Production

R. A. Neale, Vice President Manufacturing, Canadair Ltd.

Neale divides his presentation into four sections: Plans, plant, policy and people. He says people are by far the most important single factor of the four.

Canadair policy has been to keep their people informed, to try to increase their knowledge and to add to their skills. Under this kind of a philosophy, the everyday relation between the supervisor and the people under him can be a two-way process.

Neale says the proof of the success of company policy is in the labor record.

There has never been a strike, slowdown or work stoppage at the Canadair company.

He cites other factors which have a bearing on the performance of labor. There has not been strong competition for labor in their area, although there has been high turnover. The working force at Canadair is bi-lingual; 85% of the direct labor group speak French, however, the technical and supervisory people are predominantly English speaking.

Neale believes that the conditions for aircraft production in Montreal are no better than average, but that the accomplishments have been above average. The basic reason for that, he says, has been the approach to the human factor.

Some Observations on the Problem of Fatigue of Airplane Structures

Richard V. Rhode, Assistant Director for Research, National Advisory Committee for Aeronautics.

During recent years, the possibility of a fatigue crack starting in the primary tension structure of a transport wing has increased markedly. This has been connected mostly with improvements in static structural efficiency; the other design and performance trends—wing loading, speed, size—have been either favorable, of secondary importance or compensated by related effects.

Rhode doesn't see much possibility of relief from fatigue for the jet transport, even though gust frequency is reduced at high altitudes. This is because the jets will still have to climb and let down through more-turbulent air, and at a higher indicated airspeed than conventional airplanes. This would amplify gust loads and therefore fatigue damage.

Fatigue life can't be predicted currently with enough accuracy, Rhode says. He feels that warning devices (mentioned earlier by Hibbard) may safeguard against catastropic failure.

Some Factors Affecting Helicopter Design and Future Operations

R. H. Miller, Vice President Engineering, Kaman Aircraft Corp.

Helicopter speed increase can be achieved by decreasing blade loading, but at an almost prohibitive increase in power. Adding a wing surface will decrease the power required for level flight, and Miller says that the resulting compound airplane is the most promising current method. But this approach bypasses the main problem by avoiding it; Miller says that a different approach

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would be the elimination of stall on the retreating blade.

Boundary layer control is one possibility; so is use of a non-flapping rigid rotor to control the blade angle at all positions during its rotation around the hub. Practically, a sufficiently rigid blade is not possible without an extreme weight penalty. But some recent tests at MIT have shown that offsetting the flapping hinge from the rotor center can produce a harmonic variation in inertia moment which will reduce blade lift in the low-velocity regions of the rotor disk. Blade stall is avoided by this method.

The supersonic rotor is also of interest, says Miller, for providing an auxiliary lift device, or as a compact means of solving the "flying crane" problem. He quotes an example of a 15,000-lb. thrust supersonic rotor with two blades of one-foot chord and 10-ft. radius.

In powerplants, Miller feels the pressure jet would be most useful in compound aircraft and in "flying crane" applications. He disagrees with Forsyth by saying that pressure or hot-gas jets will probably not be used for transport copters.

The gas turbine engine with a mechanical rotor drive can be expected to provide the necessary weight reduction to make higher forward speeds possible.

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New Ejection Seat Works at 200 Ft.

Successful ejections at 200-ft. altitude have featured the test program of the new British Martin-Baker lightweight automatic ejection seat (AVIATION WEEK Sept. 21, p. 11).

The new design eliminates one of the features most objected to by pilots: limited rear visibility. Now only 40 in. high, the seat imposes no rearward barrier to the pilot's line of sight.

The unit weighs only 50 lb. complete with chute and harness, compared to the 185-lb. figure for the standard Martin-Baker seat. It has been developed as a private venture by the company, and is going into production in anticipation of future orders.

► **Design Changes**—Most of the weight reduction in the seat comes from the combination of the gun and guide rails. Usually separate, the cannon which fires the seat out of the airplane now serves as the guide during ejection of the unit.

Parachute and harness have been combined to save more weight, and the chute replaces the headrest of earlier models.

Supports for feet and thighs have been replaced by a nylon strap which positions the legs against the seat during ejection.

Firing is the same as before; the pilot pulls a curtain down over his face and thus sets off the charge. One second after ejection, a drogue is fired to slow the rate of descent. The harness is freed automatically after another brief delay, and the chute opens, also automatically.

The timing mechanism for separation and chute opening is controlled by a barometric device which prevents operation above 10,000 ft. There is a manual override control for parachute release, which can be operated by the pilot.

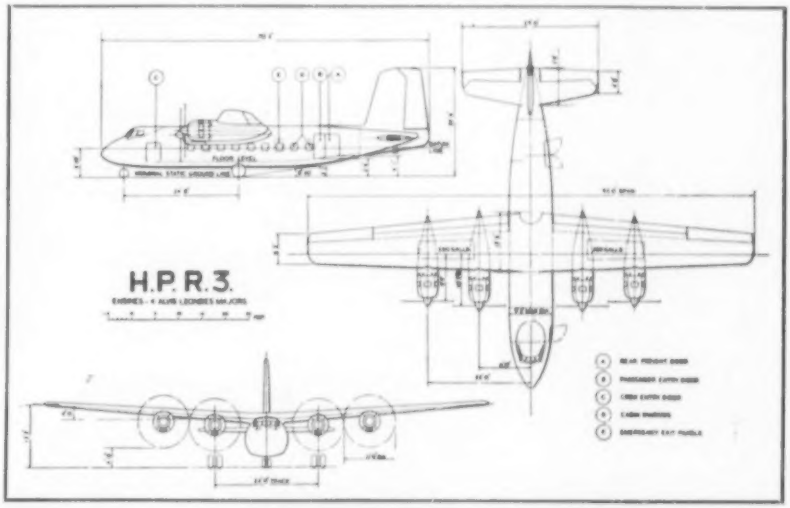
New 'Torture Bed' For Boeing Tests

A 150x195-ft. concrete slab will act as a "torture bed" for destruction testing of aircraft structural parts inside the new $5.7-million flight test hangar being completed for Boeing Airplane Co. at Seattle.

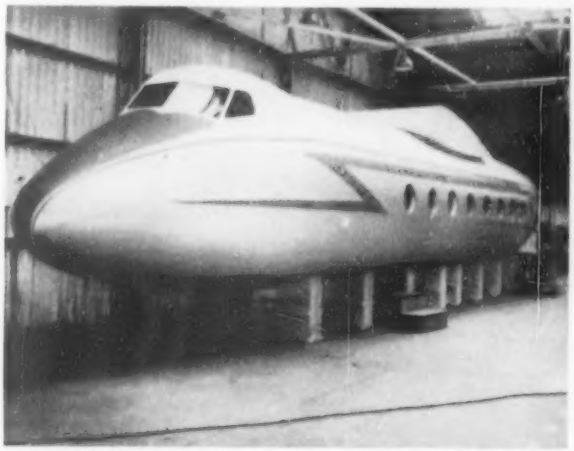
To insure a high degree of accuracy in positioning the 50-ft. towers which will transmit upward reacting loads on the aircraft structure, a tolerance of 0.10 in. in 10 ft. was maintained in laying the concrete slab. Individual tension chocks, can be moved along the entire length of the assembly to transmit concentrated loads of 85,000 lb. at any location.

HANDLEY PAGE H.P.R. 3 is recent British effort to design DC-3 replacement. It is a 36- to 44-seat transport, powered by four 870-hp. Alvis Leonides Major engines. H.P.R. 3 will carry more than 3 tons 1,500 mi. at 220 mph. (Aviation Week Sept. 14, p. 120).

Britain's New Bid For DC-3 Market



LAYOUT is flexible, takes passengers (in rear-facing seats) or freight.



FULL-SCALE mockup has been seen by many airline officials.

MANAGEMENT

MANAGEMENT TEAM IN ACTION—Top executives of the Fairchild Engine and Airplane Corporation of Hagerstown, Maryland, are shown discussing an engineering problem on the Fairchild C-119H or "Flying Boxcar."

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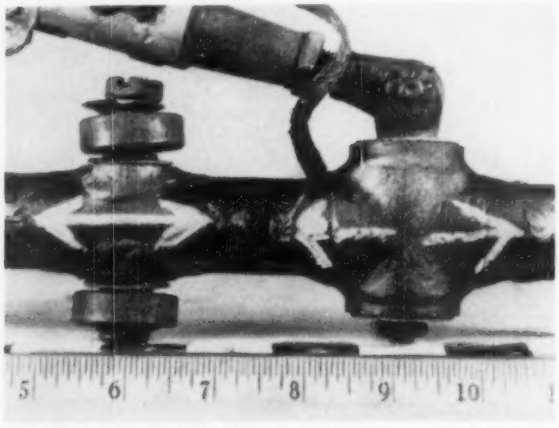
LANDING GEAR BRACKET. Except for hole in center, this steel part is solid, yet has two gas welds (arrows) running full length of one side. This puzzling placement of weld may have been for crack repair. Bracket's 1-in.-square ends appear to have been welded to $\frac{1}{8}$-in. stock. Clevises bolted to bracket's lugs are welded to attaching braces, instead of using threaded connection. Welds exhibit good workmanship.



CONTROL LINKAGE UNIT. Steel actuating arm shows some of the 10 welds in a length of about 10 in. Estimate is that it required a welder almost two hours to do the job. High quality of welds indicates excellent jigging was used. Makeup of part embodies round stock with $\frac{1}{4}$-in. wall welded to solid pieces (drilled) which accommodate track wheels (left) and clevis rod end connection (right). End is threaded to connecting rod.

Experts Bare MiG-15 Welding Techniques

Welding plays a big part in the construction of the MiG-15, the Soviet jet fighter used extensively by the Red Forces in Korea. In many cases, the applications run contrary to American production practices—where we would use assembled makeup or single-piece forgings, for instance, the Reds use welding instead.

The quality of workmanship varies widely. But this seems to be a planned procedure for getting maximum efficiency from the labor force. Where high-quality welding is required, the Reds use their most skilled operators. Less-skilled workmen and learners are assigned to jobs where the workmanship is not critical and does not interfere with the performance of the component.

Many of the parts are steel, where U. S. practice would be to use light alloys.

These are some of the conclusions to come out of a study by Air Force metallurgists and engineers of a shot-down MiG-15 salvaged off the west coast of Korea by the Navy. Salvage operations, in the shallow waters of the crash site, included use of a helicopter to carry away parts of the wreckage (AVIATION WEEK June 18, 1951, p. 11).

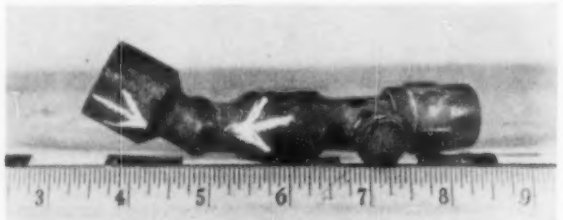
▶ **Why Weld?**—Why do the Russians use welding in place of assembled makeup or single-piece forgings? This may be due to several factors.

• **Although the Reds** have the former German 33,000-ton forge press—larger than any similar equipment in operation in this country—this giant undoubtedly is allocated to big-piece work. Then, there may be a lack of hammers and small presses to make the forgings that might normally be used instead of welded parts.

• **The fact that fittings** are not used on assemblies where one would expect to find them may be due to a strict effort to conserve materials, as well as the labor and machines required to produce fittings.

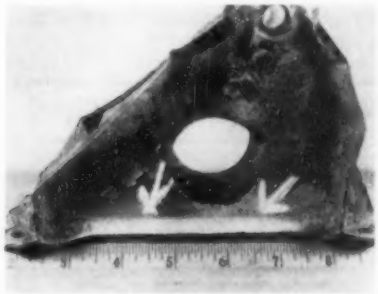
It is possible that the Russians are short of the type of skilled labor needed to build machines, whereas they

CONTROL SURFACE ROD. End part of 42-in.-long mild steel tubing shows ball bearing rod end attached by welding instead of threaded connection. Poor gas-welding probably is caused by lack of revolving jigging, the raised portions resulting from stopping and starting of welding.

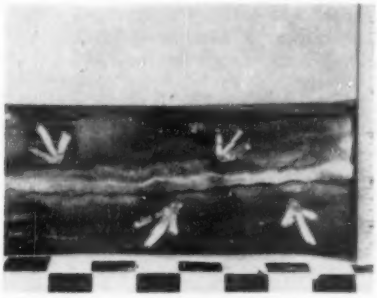


HIGH-PRESSURE FITTING. High-pressure air line part has $\frac{1}{4}$-in.-wall angled end stepped down to smaller diameter (arrow) where it is gas-welded to body of fitting, yet other end has threaded fitting. Material is low alloy steel. Weld is a perfect piece of work, apparently done with automatic jigging.

AIR LINE. This small part has three pieces of aluminum tubing (.237-in. o.d. .040-in. wall thickness) brazed to form a Y-section. Workmanship is fair, but too much brazing alloy was used, by our standards. Method of joining apparently was used to eliminate a three-way fitting.



SUPPORT BRACKET. Low-alloy sheet-steel (about .050-in. thick) bracket is extensively gas-welded. Lugs, too, are welded to sheet. Welding beads indicate excellent technique. Back side of welds are not burned through but show signs of proper adhesion.



AIR DUCT. Aluminum (.057 in. thick) air duct, measuring about 8x4 in. in cross-section, has gas weld (arrows) made with 2S filler wire. Though welding job appears crude, penetration is excellent. Joint was hammered, instead of ground, after welding.

may have ample labor skilled in such arts as welding.

• Or, the multitude of welding applications may stem simply from a finding by the Russians that it is cheaper for them to use this process.

▶ Gas Welding—Estimates are that about 75% of the welding applications on the MiG-15 use the oxyacetylene (gas) method. This may be because the

AIRCRAFT ENGINE BUILDERS LOOK TO

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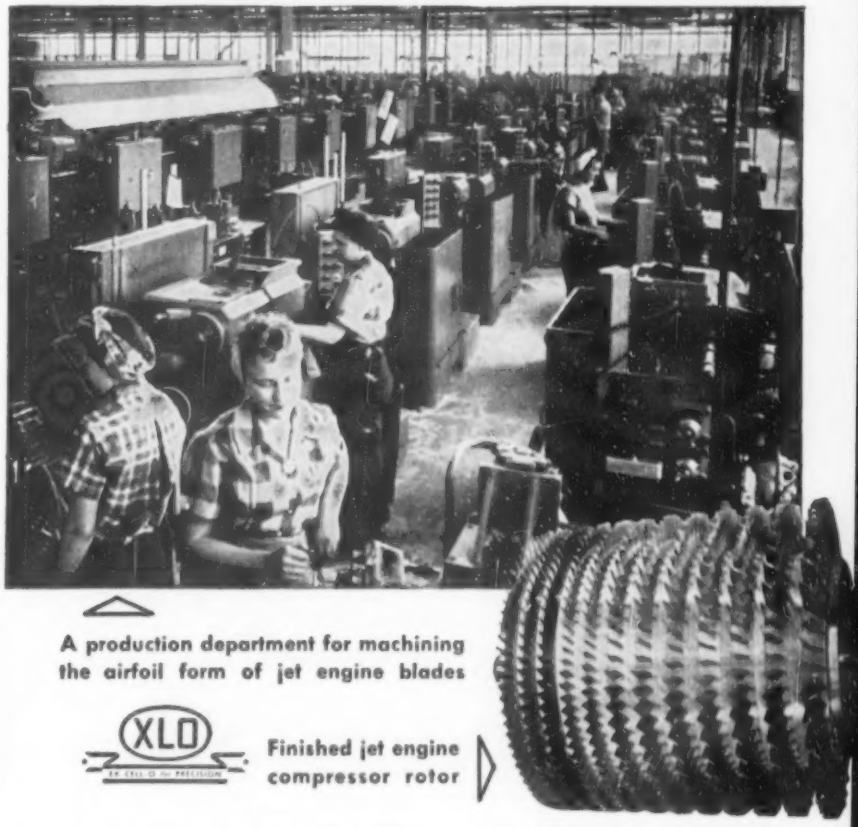

A production department for machining the airfoil form of jet engine blades

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A complete line of automatic blade finishing machines, designed and perfected at Ex-Cell-O, turns out large volumes of jet blades to the specifications of engine builders. In addition, Ex-Cell-O, through its subsidiary, Robbins Engineering Company, machines rotor wheels, inserts the blades, and assembles the complete rotors.

Plant facilities have been expanded and added employees have been trained in the machining and inspection of these precision parts and assemblies.

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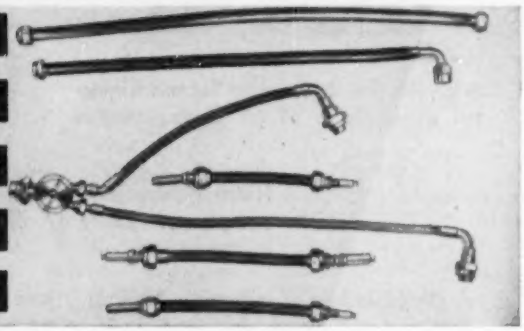

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As manufacturers of shielded ignition equipment for O.E.M. use by the industry's leading engine and airframe builders, our engineers take pride in producing products that far surpass each individual job specification. With offices in all principal cities for immediate liaison and service, we welcome the opportunity to coordinate our design and development staff activities with your needs.

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parts are small or because the method requires comparatively inexpensive equipment.

Not many resistance-welded parts are visible on the plane. However, in the art of resistance welding, the Russians are particularly capable, an impressive quality of proficiency having been attained in welding three thicknesses of material (AVIATION WEEK July 7, 1952, p. 10).

In many places where U. S. engineers would specify spot, seam or projection welding, the Russian use mechanical joints. This would seem contrary to their general leaning towards welding as a joining method.

The use of steel, where light alloys are the U. S. practice, may be attributed to Russian production being geared to the machining of steel.

No titanium has been found in Soviet equipment.

PRODUCTION BRIEFING

► **Dowty Equipment of Canada, Ltd.,** has opened a new production plant at Ajax, Ontario, bringing its total floor space at this location to more than 70,000 sq. ft. The firm makes landing gear and hydraulic units for Canadian aircraft, and manufactures other aviation equipment under license.

► **Associated Co., Inc.,** 1211 E. Douglas, Wichita, Kan., has been awarded subcontracts to build three different assemblies for the new Lockheed C-130 turboprop cargo plane. Largest of the contracts covers forward cargo doors. Firm also makes pilot and co-pilot control stands for the B-47.

► **Rheem Mfg. Co.** has moved research and development laboratories of its Aircraft Division to 9236 E. Hall Rd., Downey, Calif.

► **Stanley Aviation Corp.,** Buffalo, N. Y., plans to build a $500,000 manufacturing plant for aircraft components adjacent to Stapleton Field, Denver, Colo. The plant will employ 350 and cover more than 50,000 sq. ft.

► **Boeing Airplane Co.,** Renton, Wash., went four days ahead of its September production schedule with more than half the total number of KC-97 Stratofreighters being accepted by USAF on their first test flights.

► **Adel Division,** General Metals Corp., manufacturer of aircraft hydraulic and pneumatic equipment, heater, anti-icing and fuel system devices and engine accessories, has moved its New York engineering office to 290 Old Country Road, Mineola, L. I., N. Y.

▶**James H. Knapp Co.,** maker of furnaces and melters, has moved to a new plant at 1731 Workman St., Los Angeles 31, Calif.

▶**Aero Sales Engineering Ltd.,** has transferred its office to Billings Bridge, Ottawa, Ontario. Company's telephone number is 6-1513.

Environment Testers Form Industry Group

A new organization has been formed to supply industry with technical data on environmental testing. Known as the Institute of Environmental Equipment Manufacturers, the group's headquarters is at 30 Church St., New York.

Environmental equipment simulates low and high temperatures, salt spray and sandstorm effects, and rain, altitude and other conditions.

In addition to supplying technical data, the Institute will maintain a library, prepare standards in cooperation with the National Bureau of Standards, and issue bulletins to industry, educational organizations and research bodies.

ODM Formalizes Machine Tool Order

Office of Defense Mobilization has issued an order formalizing its policy of keeping machine tools and equipment in "packaged form" in or near the shut-down facility in which they would be used in an emergency (AVIATION WEEK Oct. 5, p. 9).

The order, ODM VII-4, defines "packaged form" as a complete complement of production equipment and tools capable of producing a particular military item or items at a particular plant.

In cases in which complements of equipment are not wholly government-owned, the order provides "every effort should be made to keep as much as possible of the total equipment complement in packaged form."

Periodic reports of implementation of the order by Defense Department are to be submitted and will be made public by ODM.

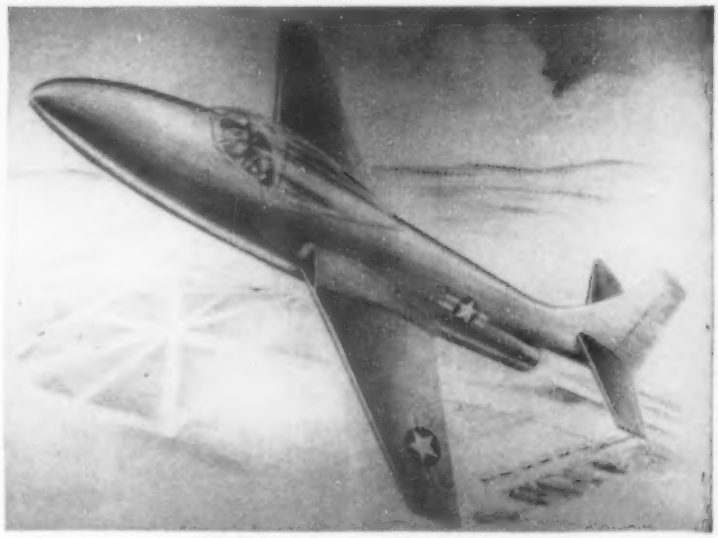
New Plant to Make Tubing for Military

A new tubing facility scheduled for completion early in 1954 will produce mainly for military items such as landing gear braces and struts, spars, rocket and Rato bodies. The plant also will be able to turn out material for civilian consumption.

The new plant will be operated for the Navy Bureau of Aeronautics by the Tube Reducing Corp., Wallington, N. J.

It is located alongside Tube Reducing's present Wallington site. It encompasses 96,000 sq. ft. and will be stocked with special purpose die-making machinery and a battery of tube reducers. Two of the latter will be E. W. Bliss giant-size machines, one of which will handle ingoing tubes from 10 to 18 in. o.d. for reductions from 9 to 17 in., with wall thicknesses as thin as .125 in.; the other large unit will process 6- to 10-in. ingoing tubes for reductions from 5 to 9 in. o.d.

Tubing metals processed at the plant



East Coast Aeronautics' MX-1962

Magnesium Jet Trainer Design

This jet trainer configuration, the MX-1962, a design entered by East Coast Aeronautics in the USAF competition won by Cessna Aircraft Co. (AVIATION WEEK Jan. 12, p.15), was planned to incorporate all-magnesium makeup. The Pelham Manor, N. Y., firm is a pioneering advocate of magnesium airframes for simplification of structure and consequent lower production costs.

▶**No Stiffeners**—Fuselage of ECA's design is made up of a series of closely spaced rings, four longerons, plus a skin thicker than would be used in aluminum alloy makeup. All stiffeners are eliminated.

Wing is a two-spar box structure complemented by an auxiliary beam for flap and aileron support. There are five ribs per panel. Skin between front and rear spars is tapered from about ¼ in. at the root to about ⅛ in. at the tip. Two nylon bladder-type fuel cells are housed in each panel in uninterrupted bays between spars. Outer five feet of the wing panel span can be quickly removed for replacement in the event of wing damage.

▶**Easy Access**—Nose section of the fuselage forward of the cockpit contains the major portion of the avionic and electrical equipment. Easy access to this area is by removal of two half-shell fairings.

Aft of the wing trailing edge, a large bottom-half fuselage door gives wide access to the turbojet installation in the aft fuselage section. This access feature also permits the engine to be lowered onto a dolly for quick changing. Engine exhausts beneath the empennage assembly. Powerplant is a Westinghouse J34-WE-36.

Ducts from the wing root air intakes angle up to the higher level of the engine compressor. Located between the ducts and running forward to the cockpit rear is another, large fuel tank.

▶**Dimensions**—Plane's length is 36 ft. 5½ in., span is 36 ft. 4 in. Wing section is NACA 65$_1$-215. Dihedral is 6 deg., leading edge sweepback 2 deg. 57 in. Total wing area is 200 sq. ft. Tail sections of the trainer are NACA 0012.

Total area of horizontal tail is 38½ sq. ft., total vertical tail is 15.3 sq. ft.

Empty weight is pegged at 4,995.9 lb. Design useful load is 3,036.5 lb., and design gross is 8,032.4 lb.

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AND
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You are invited to write regarding long-range projects at Northrop Aircraft, Inc. Exceptional opportunities now exist to join the company's engineering and scientific staff. If qualified, you may select important developmental work, or equally vital production engineering.

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Qualified engineers and scientists who wish to locate permanently in Southern California are invited to write for further information regarding these interesting, long-range positions. Include an outline of your experience and training. Allowance for travel expenses.

Address correspondence to
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will include carbon and alloy steels, stainless, titanium, aluminum, copper and brass.

New Contour Miller Comes in Small Size

A new "Kellering" machine, smaller than those previously available, has been developed by Pratt & Whitney division of Niles-Bement-Pond Co., West Hartford, Conn. It is an automatic electric-tracer-controlled miller patterned after the Keller BG-22.

Models of the new machine—Model BG-21—may be obtained in five different sizes ranging between 4 ft. x 2½ ft. and 10 ft. x 4 ft. Special two-spindle units also are available.

Rapid traverse up to 250 in./min. and automatic chip conveyors are standard features on the larger models.

Navy Contracts

Contracts recently announced by the Navy's Aviation Supply Office, 700 Robbins Ave., Philadelphia 11, are:

The Bristol Co., Aircraft Equipment div., Waterbury 20, Conn., control for various aircraft, 54 ea., $26,309.

Burton Electrical Engineering Co., 100 Lomita St., El Segundo, Calif., electrical receptacles, $30,430.

Cannon Electric Co., 3209 Humboldt St., Los Angeles 31, Calif., electrical receptacles for use on various aircraft, $29,951.

Douglas Aircraft Co., Inc., 3000 Ocean Park Blvd., Santa Monica, Calif., maintenance parts for R5D aircraft, $119,609.

Engineering & Research Corp., Riverdale, Md., motor amplifier assys., $130,454.

Gould-National Batteries, Inc., 35 Neoga St., Depew, N. Y., aeronautical storage battery, $62,738.

General Motors Corp., Delco Products div., 329 E. 1st St., Dayton 1, Ohio, motor for use in AD-4N and AF-2W aircraft, 342 ea., $33,301.

General Motors Corp., Rochester Products div., 1000 Lexington Ave., Rochester 3, N. Y., regulator assy. for F6F-5K aircraft, 90 ea., $28,242.

Hub Paint & Varnish Co., Inc., 47-38 Fifth St., Long Island City, N. Y., interior enamel, 23,650 gal., $39,290.

Hughes Aircraft Co., div. of Hughes Tool Co., Culver City, Calif., valve assy., 177 ea., $26,984.

Lear, Inc., 110 Ionia Ave., N. W., Grand Rapids 2, Mich., rotary actuator for F2H-2,-2P aircraft, 61 ea., $40,171.

Lite Mfg. Co., Inc., 101 W. 21st St., New York 11, N. Y., webbing assy., safety, 3,830 ea., $29,683.

Lord Mfg. Co., 1635 W. 12th St., Erie 6, Pa., core mount used on mount assys. for various aircraft, 3,602 ea., $35,264; assemblies for various aircraft, 1,021 ea., $80,-218.

New Departure Div., General Motors Corp., Bristol, Conn., anti-friction bearing, 18,-000 ea., $30,240.

North American Aviation, Inc., Columbus div., 4300 E. 5th Ave., Columbus 16, Ohio, maintenance parts for SNJ aircraft, $63,-750.

Scintilla Magneto div., Bendix Aviation Corp., Sherman Ave., Sidney, N. Y., maintenance parts for R2800-50-52 engine, $358,808.

Technicraft Corp., 1701 Main Bldg., Kansas City 8, Mo., engine cover, 107 ea., $26,215.

Transitron, Inc., 154 Spring St., New York 12, N. Y., tester high-voltage insulator used for various aircraft, 1 ea., $31,317.

Winslow Co., Inc., 9 Liberty St., Newark, N. J., indicators for various aircraft, 319 ea., $31,517.

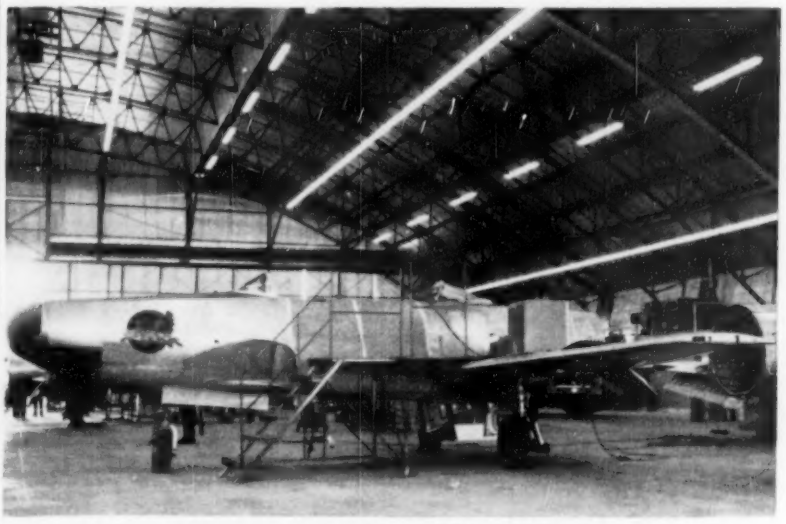
Wood Electric Co., Inc., P. O. Box 322, Newburyport, Mass., circuit breaker for general application, 7,180 ea., $31,520.

Aero Equipment Corp., Enterprise & Trevitt Sts., Bryan, Ohio, services and material to overhaul pumps, $26,846.

Benson Mfg. Co., 1811 Agnes Ave., Kansas City 1, Mo., rotor assy. for HUP-1,-2 aircraft, 66 ea., $53,360.

Berger Bros. Co., 135 Derby Ave., New Haven 7, Conn., coverall suit, 1,925 ea., $75,171.

Blocksom & Co., Michigan City, Ind., cushioning material, $38,104.



SHOP TRICK SPEEDS F-94 OVERHAUL

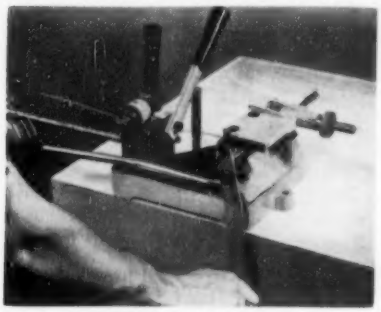
A temporary shop modification to Lockheed F-94 all-weather jet fighter's landing gear permits Lockheed Aircraft Service, Inc., to move the planes down the line sideways and accommodate more planes in the hangar. All three wheels of the F-94's landing gear are rotated by disconnecting the scissors and installing a bent bar at the 90-deg. position. The firm has been overhauling an undisclosed number of the jets at Ontario, Calif.

Fast Writeoffs

Accelerated tax amortization for manufacturers expanding their defense facilities is granted by the government in the form of certificates of necessity.

In the following list of recent certificates, company name is given, followed by product or service, cost of construction deemed necessary for defense expansion, and the percentage of the expansion cost allowed for fast writeoff. Fast writeoff permits property to be depreciated in five years.

- **Driver-Harris Co.**, Harrison, N. J., nickel alloys for military electronics, $506,450, 60%.
- **Ex-Cell-O Corp.**, Highland Park, Mich., aircraft parts, $563,710, 65%.
- **Minneapolis-Honeywell Regulator Co.**, Hopkins, Minn., research and development for the armed services, $439,750, 40%.
- **Cessna Aircraft Co.**, Wichita, Kan., aircraft assemblies, $400,000, 60%.
- **Remington Rand, Inc.**, Engineering Research Associates Div., St. Paul, Minn., research, development and production of electronic equipment, $1,467,685, 45%.
- **Hughes Tool Co.**, Hughes Aircraft Div., Culver City, Calif., research, development and production of military items, $87,024, 40%.
- **Boeing Airplane Co.**, Seattle, Wash., aircraft and aircraft parts, $203,990, 65%.
- **Boeing Airplane Co.**, Wichita Div., Wichita, Kan., aircraft and aircraft parts, $25,557, 65%.
- **Farmer Bros. Co.**, Los Angeles, Calif., aircraft parts, $64,986, 70%.
- **Pan American Refining Corp.**, Yorktown, Va., aviation grade alkylate, $2,900,000, 100%; $280,000, 45%.
- **General Metals Corp.**, Adel Div., Burbank, Calif., aircraft parts, $136,775, 65%.
- **Kollsman Instrument Corp.**, Elmhurst, N. Y., aircraft instruments, $252,921, 65%.
- **Kollsman Instrument Corp.**, Syosset, N. Y., scientific and technical equipment for defense, $620,000, 40%.
- **Glenn L. Martin Co.**, Middle River, Baltimore, Md., aircraft, $140,000, 60%.
- **Douglas Aircraft Co., Inc.**, Long Beach, Calif., aircraft and parts, $109,149, 60%.
- **Western Electric Co., Inc.**, Winston-Salem, N. C., electronic equipment, $100,919, 65%.
- **Westinghouse Electric Corp.**, Lester, Pa., aircraft components, $209,200, 65%.
- **Palmer Mfg. Co.**, Cleveland, Ohio, ordnance and aircraft parts, $22,407, 70%.



SPRING MAKER

Wire up to ¼ in. in diameter, can be wound into extension, compression, torsion and flat springs with this Di-Arco spring winder, says its maker, O'Neil-Irwin Manufacturing Co., Lake City, Minn. Unit is shown here winding extension spring. Wire is threaded through tension control and cut-off device, locks into cam mechanism without kinking.

Northrop Snark

The Snark B-62, an advanced pilotless bomber, is the product of seven years' development effort by Northrop Aircraft and the United States Air Force.

Northrop merges competitive production ability with pure research to design and build mighty defensive weapons such as the Snark and the F-89D Scorpion, America's most heavily-armed fighter.

And Northrop backs up its research and production teams with the stability of sound business administration, to yield more air power per dollar for the defense effort.

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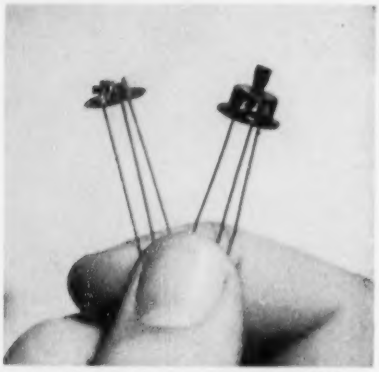


TRANSISTORS for operation at 150C are under experimental test at GE, which is already producing 100C unit (shown in photo above).

LOW-NOISE TRIODE is designed for use as RF amplifier at frequencies up to 3,000 mc. Tube is currently in limited production at GE.

NEC Reports Electronic Advances

By Philip Klass

Chicago—One of the most significant disclosures of avionics interest at the recent three-day National Electronics Conference here came during an after-hours session at which a General Electric spokesman reported on new transistor developments.

GE reported that its recently announced high-temperature (100C) hermetically sealed germanium junction transistor is demonstrating long life under test and that new experimental germanium transistors are now operating up to 150C. These units may soon be available. Previous limitations on transistor life and temperature have restricted their application in avionic equipment.

During the meeting, GE also announced a tiny new low-noise triode, suitable for aircraft use, capable of operating as a Class "A" amplifier up to 3,000 mc.

▶ **Tinkertoy Interest**—The radically new Project Tinkertoy for mechanized production of electronic equipment (AVIATION WEEK Sept. 28, p. 17; Oct. 12, p. 72) got its first public showing at NEC in a Navy-National Bureau of Standards exhibit, which attracted lots of attention. Engineers jammed the booth, and a smaller one of Sanders Associates, Inc., which participated in the Tinkertoy program, to see photographs and samples of the Tinkertoy modules and equipments constructed from them.

More than 600 people overflowed the Hotel Sherman auditorium to view a movie of the Tinkertoy pilot plant, in operation near Washington.

A GE engineer's paper describing an automatic punch press, designed as a part of a Signal Corps program to develop an automatic factory for producing electronic equipment, was originally scheduled for presentation at NEC but was withdrawn at the last minute. Observers wondered if the recent Navy announcement of Project Tinkertoy was responsible for the withdrawal.

▶ **Ninth Conference**—Attendance at this ninth annual NEC totaled 6,881, an increase over last year's 6,165 figure, but slightly under expectations. The NEC is sponsored by the American Institute of Electrical Engineers, Institute of Radio Engineers, Illinois Institute of Technology, and Northwestern and Illinois Universities; Purdue, Wisconsin Universities, Radio-Electronics-Television Mfgrs. Assn., Society of Motion Picture and Television Engineers participated.

None of the 22 different technical sessions were devoted specifically to aviation, possibly reflecting the fact that industry and universities in the Chicago area are more active in the fields of radio-television and industrial electronics. However, the nearly 100 papers given included subjects in servomechanisms, transistors, electron tubes, circuits, and filters—many with application to avionics.

Among these papers were reports on:

- **USAF's Electronic Component Information Center.**
- **Advanced transistor circuitry.**
- **Transistor-magnetic servo amplifier.**
- **Designing for high temperatures.**
- **Mechanical filters.**
- **Electron tube noise tester.**

▶ **Encouraging News**—At the GE after-hours session, Charles Rouault, of the company's Tube department, reported that some of GE's recently announced hermetically sealed 100C junction transistors (Types 2N43,44,45) have operated now for several thousand hours under cycling conditions (one hour on, one hour off).

The largest number of transistor failures, amounting to a "couple percent," occurred during the first 50 hours of life test, much like vacuum tubes, Rouault reported.

This suggests that manufacturers may give their transistors a 50-hour burn-in period, as is now done with some vacuum tubes, to weed out the weak sisters.

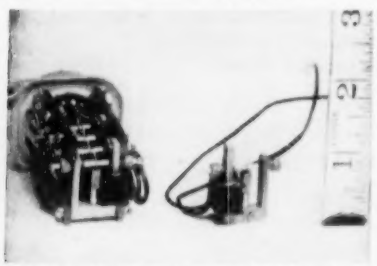
▶ **Hope for Higher Temperatures**—As for the prospect of using silicon for higher temperatures and powers, Rouault believes it is extremely difficult to work with silicon and that there is no basic limitation to using germanium for temperatures possibly as high as 400C.

Present temperature limit is set to prevent transistor leads from melting off, rather than because of damage to germanium, Rouault said.

The use of aluminum-antimony composition in transistors is also not indicated, Rouault feels, as these materials have proven unstable and, in time, disintegrate to powder.

He predicted that the present top operating frequency of 2 mc. for transistors would eventually be raised to 20 mc.

GE has priced its new p-n-p (positive-negative-positive) hermetic-seal



TINY HIGHSPEED RELAY developed by GE has response time as low as 50 microseconds and operates on extremely low power.

ELECTRO-MECHANICAL filter element developed by RCA uses combination of metal plates and ferrite transducer core to reduce filter losses.

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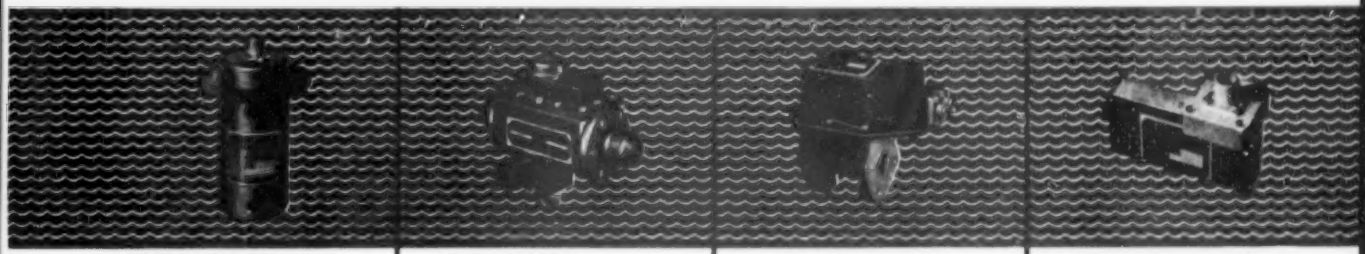

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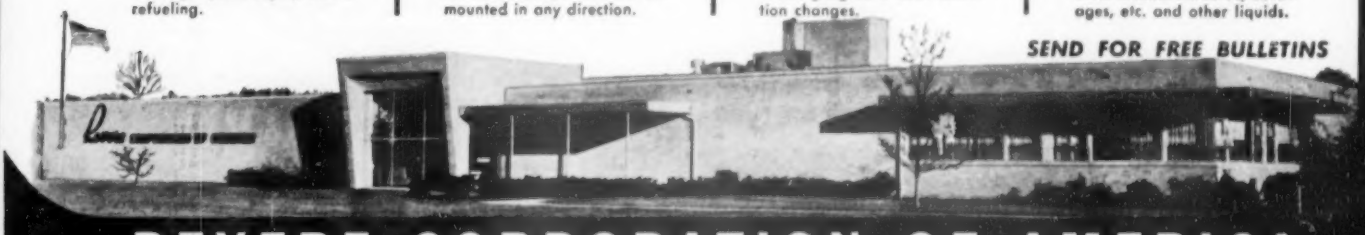

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charted by Brush Oscillograph

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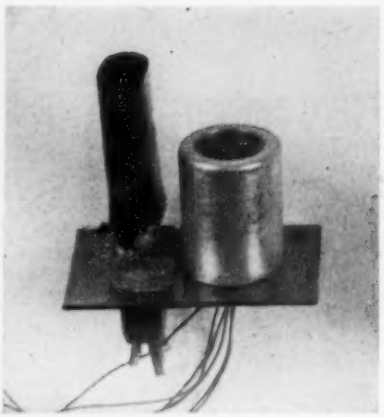


MICROMINIATURE IF transformer (right), developed by RCA for transistor circuits, is dwarfed by tiny transistor, shown at left.

junction transistors at $3.75 to $7.50 and hopes to be producing 1,000 a day by the end of the year, a spokesman said. Present deliveries, however, are quoted at 12 weeks.

▶**New Low-Noise Triode**—GE's new GL-6299 co-planar receiving-type triode is suitable for use as an RF amplifier in radar or microwave receivers as well as in aircraft communication and navigation equipment operating in the VHF and UHF bands. GE quotes a noise figure of 8.5 db. at 1,200 mc. and 14 db. at 3,000 mc., with gains of 16 db. and 11 db., respectively, when tube is used as a class A amplifier.

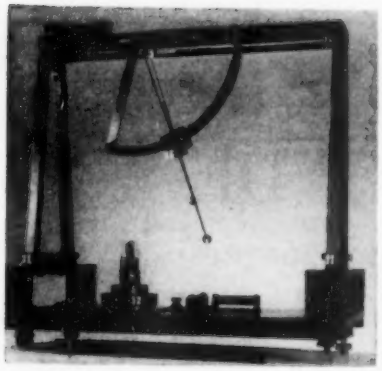
Smaller, less costly than its predecessors, the GL-6299 is one inch long and weighs ⅛ ounce. Bandwidth is 10 mc. and maximum plate dissipation is two watts, company says. GE is experimenting with GL-6299 as an oscillator at frequencies up to 5,000 mc., a spokesman reports.

▶**Report on ECIC**—The USAF's Electronic Components Information Center (ECIC), designed to provide electronic equipment designers with rapid answers to questions on components available to meet their needs, was described by R. A. Corby of the Battelle Memorial Institute which is setting up ECIC (AVIATION WEEK Sept. 7, p. 40).

Corby reported that Battelle is now obtaining design and application data on all available resistors and relays so that the ECIC can be placed in limited operation in 1954, if Wright Air Development Center, which is sponsoring the program, so desires.

All data will be recorded on IBM punch cards enabling the center to search its files and answer questions in four hours or less, Corby said.

▶**Transistor Comes of Age**—Papers describing fairly sophisticated transistor circuitry were evidence that the transistor is fast coming of age. For example:



TUBE NOISE TESTER developed by Navy reportedly permits accurate and repeatable tests and measurement of electron tube microphonics.

• **Automatic gain control circuitry** for junction-transistor audio or intermediate frequency amplifiers, which reduces a 30:1 variation in input signal to less than a 2:1 variation in output, was described by F. H. Blecher of Bell Telephone labs, Murray Hill, N. J.

Output of the amplifier is demodulated to give a d.c. signal, proportional to average carrier signal level, which is then used to buck or boost transistor emitter current.

"With further development, it should be possible to incorporate automatic gain control in one stage of a transistor receiver, which will compare favorably with the gain control applied to several stages of vacuum tube receivers," Blecher predicted.

• **Amplitude stabilized oscillator,** audio frequency, providing an overall efficiency as high as 75%, low distortion, 100 db. signal to noise ratio, and good amplitude stability was described by E. R. Kretzmer, also of Bell labs, Murray Hill. He reported amplitude stability of one percent over wide ranges of supply voltage, output loading, and temperature.

Oscillator uses two junction transistors in push-pull Class C operation in which output voltage is compared to a reference voltage obtained by means of the so-called Zener effect in semiconductors.

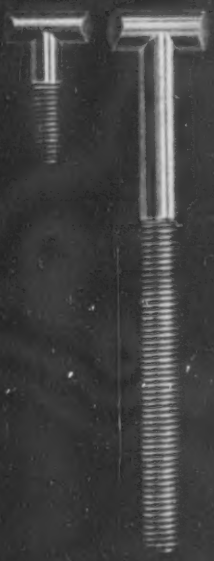
• **Theory of feedback** for use in transistor circuits and a simple stability criterion, were described by Dr. S. K. Ghandhi, General Electric, Syracuse, N. Y.

• **Improved long-delay lines** are possible by using transistor amplifiers between individual sections of the line to overcome normal attenuation, A. H. Schooley of the Naval Research lab, Washington, D. C., told the NEC.

He described a 1,000-ohm, 70-microsecond delay line with signal rise and decay times of less than one microsecond in which attenuation had been reduced from 110 db. to zero by inser-

4th *dimension of quality*

on time delivery



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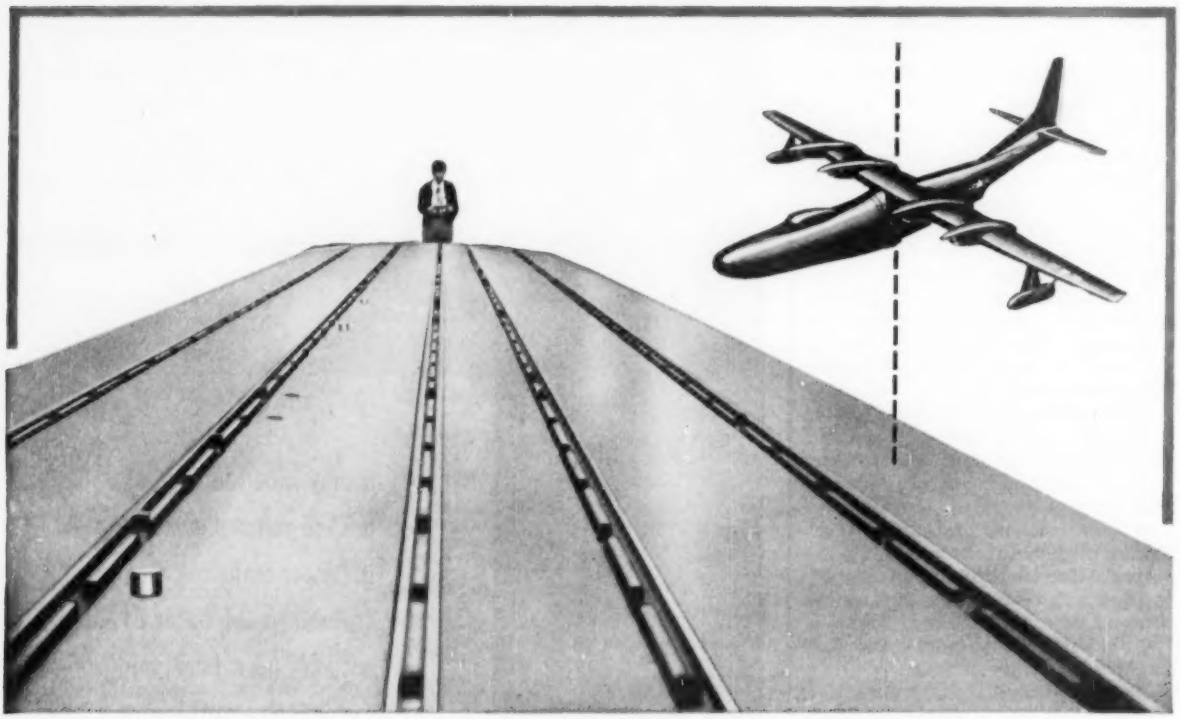

MAGNESIUM EXTRUDED CARGO DECK SECTION *of the new Convair-built Navy R3Y-1 "Tradewind" now in production at San Diego. Magnesium provides the R3Y-1 with a tough, yet lightweight, easily installed cargo deck for heavy-duty service*

In all its 40-year history, water-based aircraft has never been appraised in terms of speed or maneuverability. The big lumbering transports of past years were reputedly slow and cumbersome in flight. This was true primarily because of their great weight.

Today, however, Convair and the U. S. Navy present the "Tradewind" as the fastest flying boat in aviation history. Its turbo-prop engines provide a top speed of more than 350 mph . . . enable it to take off in 30 seconds with full load.

One factor that contributes greatly to the increased speed and easy handling of this giant seaplane is the extensive use of magnesium in its design. Take as an example, the cargo deck. It's made of magnesium ZK60A extrusion alloy. It's light in weight. (Magnesium is the world's lightest structural metal!) And it's strong and rugged enough for heaviest duty. This combination of qualities makes magnesium perfectly suited for this application.

There are other instances, too, in this and in other aircraft, where magnesium has helped designers solve some of their weight and speed problems. Have you considered magnesium for your uses? For more detailed information, contact your nearest Dow sales office, or write directly to THE DOW CHEMICAL COMPANY, Magnesium Department, Midland, Michigan.

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tion of simple transistor amplifiers requiring less than 0.1 watt power.

• **Active element filter** using transistors as negative impedance converters, which overcomes high insertion loss and reduces number of elements used in passive RC filters, was described by J. G. Linvill of Bell labs, Murray Hill. He reported that filter stability is adequate for many applications.

• **Stability analysis** of transistors used in switching circuitry such as in digital computers was presented by T. R. Bashkow, Bell labs, Murray Hill.

► **Transistor-Mag Amplifier Wedded**—The mating of the transistor and magnetic amplifier (both of which hold attractive advantages for avionic use) in a servo amplifier was described by Dr. G. F. Pittman of Westinghouse Electric Corp., Pittsburgh. The marriage is a logical one because both are current-operated devices rather than voltage-operated as with electron tubes.

Pittman described a circuit in which a p-n-p junction transistor (grounded base connection) served as the input stage for a self-saturating mag amplifier. The combination provides incremental power gain of 22,000 and a one-cycle response time, giving a figure of merit of 22,000, Pittman reported.

Use of a transistor instead of a mag-amplifier in the input stage reduces over-all response time without affecting circuit flexibility or power capability of magnetic output stage, Pittman said.

In the question session following Pittman's paper, an engineer from Raytheon Manufacturing Co. reported that his company had built combination transistor-magnetic amplifier servo systems. (Kollsman Instrument Co. has also developed a combination transistor-magnetic servo amplifier. See AVIATION WEEK Sept. 28, p. 48.)

► **Magnetic Frequency Converters**—Growing use of magnetic amplifiers, whose response time is inversely proportional to their power supply frequency, has generated interest in higher frequency power supplies. For some applications, such as instrument type servo systems, where only a few watts of power are needed, magnetic amplifiers can themselves be used to double or triple the basic 60- or 400-cycle supply frequency, according to L. C. Harriott of General Electric's General Engineering lab, Schenectady, N. Y.

Advantages of magnetic frequency converters, Harriott said, are long life, good efficiency, and simplicity. Disadvantages are low power factor and undesirable harmonic content in the output. Both of these can be satisfactorily overcome in low power applications, Harriott reported, and he described four elementary circuits for doubling or tripling supply frequency.

► **High-Temperature Design**—Digital computers can be designed for operation at 200C with components currently available, but it will be difficult to exceed this figure. This is the conclusion of J. F. Koch, Jr. and G. C. Hand, Jr. of Technitrol Engineering Co., Philadelphia, who described the design of a medium-speed (500-kc.) serial-type binary digital computer built for operation at 200C.

The authors were unable, for security reasons, to disclose the end use of the device but a design requirement for minimum size and 200C operation strongly suggests that the computer is slated for use in aircraft or missiles.

After extended investigation of suitable high temperature components the following were selected:

• **Resistors:** International Resistance Co.'s type DCC deposited-carbon and BOC borocarbon resistors, de-rated by a factor of four. Stablohms produced by Chase Resistor Co. and Carbon Coat resistors made by Electra Manufacturing Co. were also used to some extent. The authors pointed out that the de-rated resistors were used under pulse (intermittent) loading rather than continuous loading.

• **Capacitors:** Small fixed capacitors made by Corning Glass Works and Vitramon, Inc., with a voltage de-rating of 4:1 operated at 200C with practically no failures due to shorting, the authors reported. For larger by-pass capacitors, the authors recommend standard tubulars made with Teflon as a dielectric.

• **Vacuum tubes:** Premium-type subminiature tubes made by Raytheon and Sylvania Electric, when used with good thermal conducting tube mounts and a de-rating factor of two, showed negligible failures, the authors reported. Of some 400 tubes used, approximately 5% failed and the bulk of these were mechanical breakage of the leads during assembly.

• **Solder:** Pointing out that a circuit can be no more reliable than its connections, the authors reported that they had found X-25 flux-cored solder, made by Division Lead Co., suitable for 200C operation.

• **Mounting boards:** The authors recommend a silicone fiber glass laminate for component mounting boards.

• **Transformers:** Transformers were wound on Teflon bobbins using Ceroc T, ceramic, and Teflon coated wire

Reliability

"Reliability is much more than ruggedizing receiver tubes and component parts. Reliability must begin with the basic concept and design of the equipment and its functions. Engineers must accept the responsibility for differentiating between the practical solution and the impracticable complex solution. Just a solution of the problem is not enough. The first step toward improved reliability must be the critical evaluation of the solutions in terms of simplicity of design, ease of production, ease of servicing, and results returned in the application."—P. V. Galvin, president, Motorola, Inc., in an address delivered at National Electronics Conference.

MOBILE GUNSIGHT TESTER

Mobile gunsight tester enables USAF to speed trouble-shooting, maintenance, and pre-flight testing of computing gunsights used in AF fighters, such as this F-86 Sabre. Maintenance personnel drive Jeep-mounted (and Jeep-powered) tester alongside airplane instead of having to taxi plane to the armament area. Mobile tester, outfitted by Air Materiel Command's Gentile AF Depot, Dayton, is expected to increase gunsight reliability by making it possible to check gunsights more frequently.

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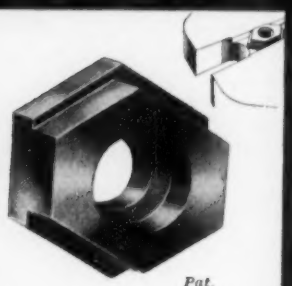

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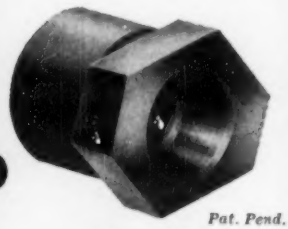

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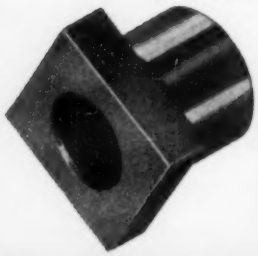

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▶ **Highspeed Relay**—A tiny impulse-type polarized relay having an operating time adjustable in the range of 50 to 300 microseconds and operating on less than 50 x 10^{-9} watt-seconds of energy was described by A. F. Bischoff of GE's General Engineering lab, Schenectady, N. Y.

The relay's high speed permits its use in flip-flop circuits and its low operating power allows its excitation from transistor circuits, Bischoff said. Relay is shock-resistant and tests indicate a life expectancy of 20 million switching operations, Bischoff reported.

▶ **Electro-Mechanical Filters**—Electromechanical filters which substitute a mechanical resonator for the conventional LC (inductance-capacitance) filter circuit, offer attractive advantages of small size, low weight, and high Q (selectivity), Stanley P. Lapin, Motorola, Inc., Chicago, told the NEC.

At frequencies near 450 kc., "it is difficult to obtain electrical inductors with Qs above 200, while retaining a practical size," Lapin said.

If electrical LC filters are replaced with E-M filters using vibrating metal plates, Qs of up to 3,000 can be obtained, and quartz crystal resonators may have Qs up to 30,000 in air and up to 400,000 in a vacuum, Lapin said. The greater selectivity permits crowding more channels into the radio spectrum.

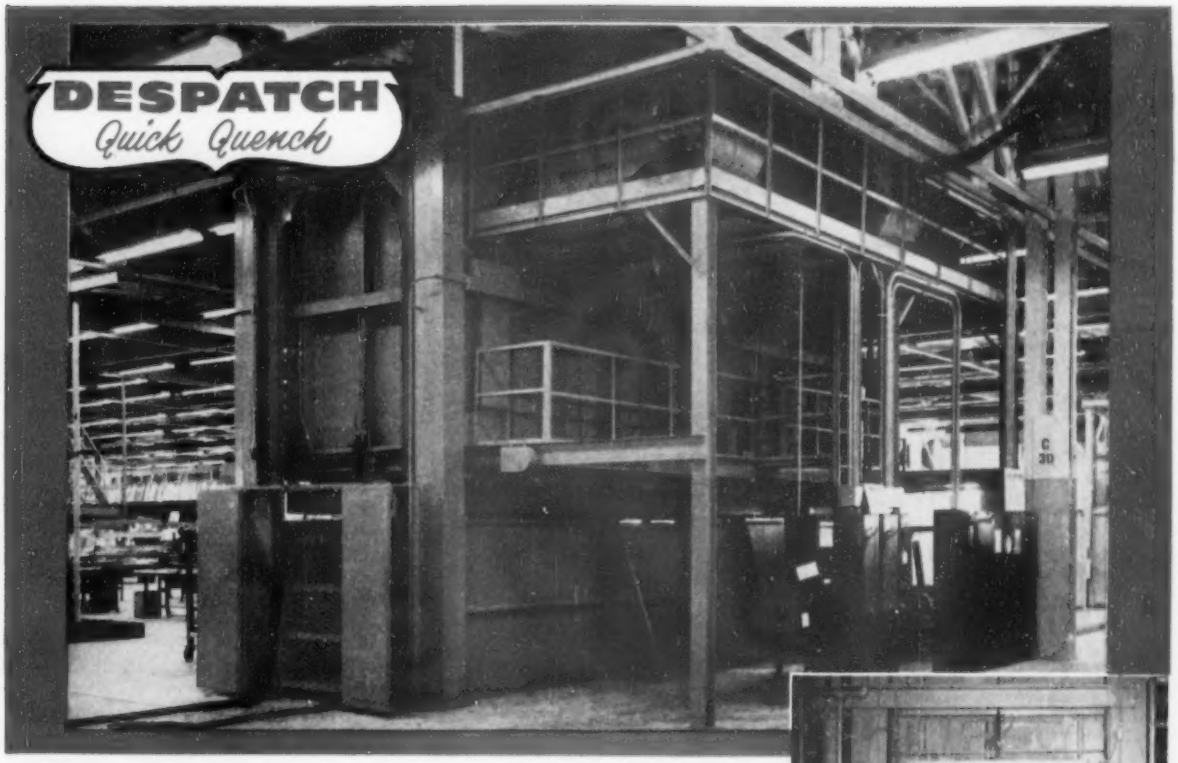
After discussing the theory of E-M filters, Lapin described a seven-plate unit with the following characteristics:

- **Six-db. bandwidth:** 10 kc.
- **Sixty-db. bandwidth:** 16 kc.
- **Spurious responses:** More than 68 db. down; closest response is 43 kc. from center frequency.
- **Insertion loss:** 8-15 db., depending upon the type of transducer used.
- **Characteristic impedance:** 1,500 ohms with magnetostrictive drive; 100,000 ohms with piezoelectric converters.

▶ **Ferrites and Filters**—In a paper devoted to ferrites and their radio-frequency properties, Robert L. Harvey of RCA labs, Princeton, N. J., described an E-M filter using ferrite transducers at each end of the resonator whose five center elements are made of metal.

The combination of ferrite and metal greatly reduces eddy current losses while providing a filter with a very low temperature coefficient. The five- (resonator) element filter described has a mechanical Q in excess of 10,000, Harvey reported.

Because of ferrites' relatively high permeability at RF frequencies, they are extremely useful in the miniaturization of transformers, and RCA is developing tiny ferrite core transformers



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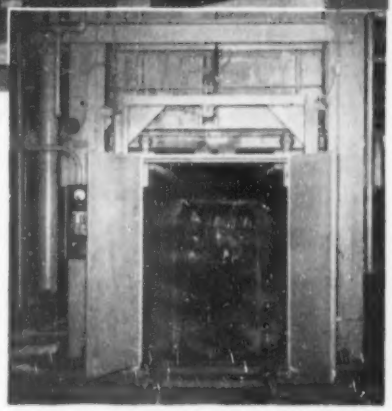
910° F. IN 25 MINUTES: A 426 KW heater has sufficient capacity to raise a 950# aluminum work load plus a 1000# steel rack to 910° F. in 25 minutes. Two high volume recirculating fans of 25,000 CFM each deliver heated air to the furnace, and heat uniformity is assured within a ± 5° F. Furnace is designed to operate up to 1250° F. when desired.

ELEVATORS AND WORK CHAMBER DOORS are hydraulically operated and interlocked with push button controls providing automatic sequence operation thru the complete cycle from heat treating to quench to unload. Furnace takes a work rack 4′ wide, 5′ high and 22′ long.



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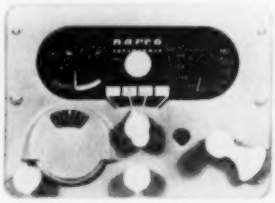
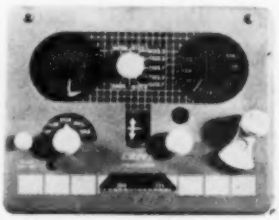


THE SUPERHOMER. Omni, 4 channel VHF transmitter and tuneable VHF receiver. Built in power supply. Weighs 10½ lbs. installed.



THE OMNIGATOR. Omni, VAR, 8 channel VHF transmitter, tuneable VHF receiver, ILS localizer, 75 mc marker. Weighs 18½ lbs. installed.

Dept. 3

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for use with transistor circuits. Harvey showed a 455-kc. intermediate frequency transformer with a Q of 140.

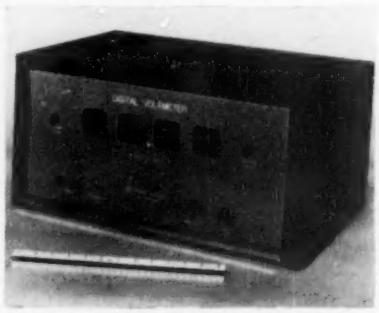
Harvey cautioned circuit engineers considering the use of ferrites to remember that many of them have a very large temperature coefficients of permeability and that they suffer a rapid decrease in Q, due to magnetic resonance, as operating frequency is increased.

▶ **Measuring Microphonics**—A new equipment for measuring audio-frequency impulse noise and microphonism of electron tubes, which reportedly has a high degree of repeatability, was described in a paper by R. J. Wohl, Stanley Winkler, L. N. Heynick and Marvin Schnee of the Navy Material Laboratory, Brooklyn, N. Y.

"Noisy" tubes, which produce spurious output signals under shock and vibration, have long been a headache in avionic and military applications. One reason is the difficulty in establishing a method for measuring and specifying allowable tube noise.

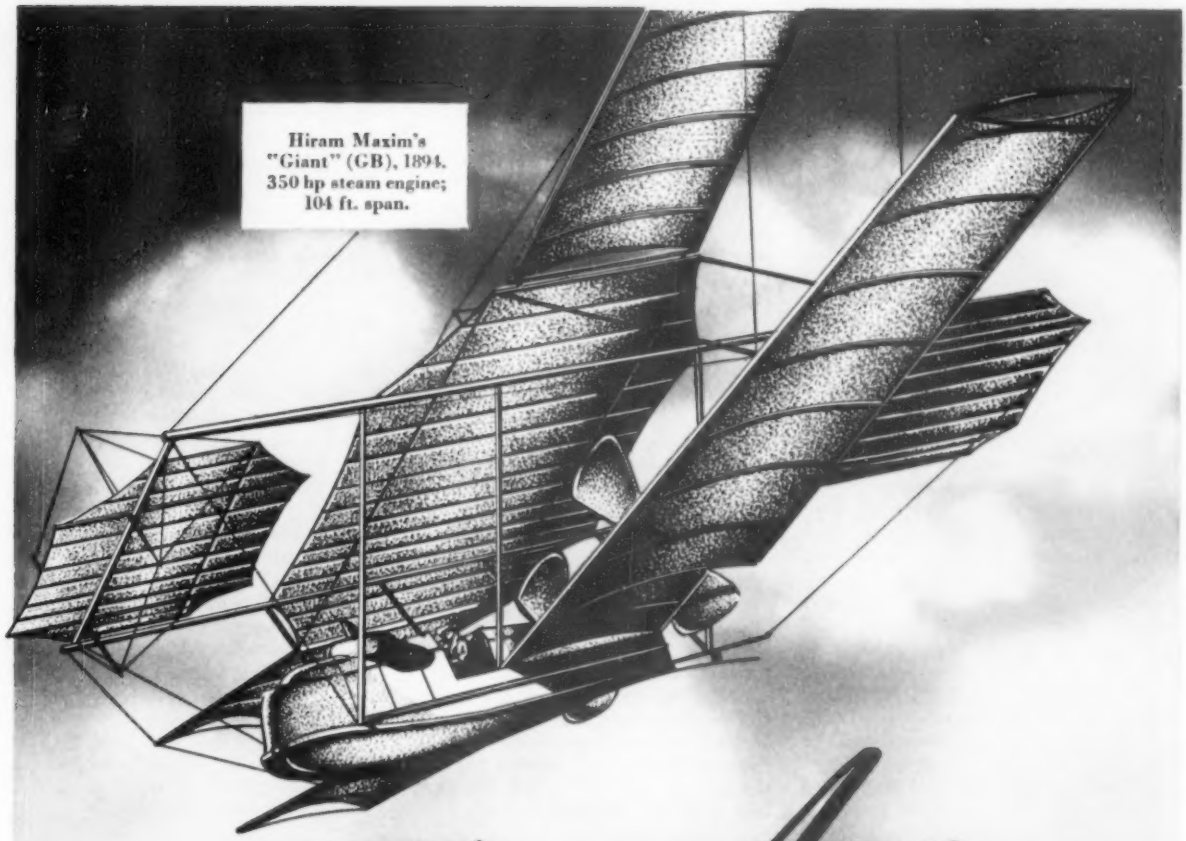
The new system uses a pendulum swung through calibrated distances to deliver a sharp impact to the tube under test without destroying it. The device provides good repeatability of test results, according to the authors of the NEC paper. The system is reportedly under consideration by the Dept. of Defense as a standard for evaluating noise in tubes purchased by the military services.

▶ **Proceedings Available**—All of the technical papers given at the NEC will be published in Volume Nine of the "Proceedings of the National Electronics Conference" which will be available early next year. Copies may be ordered from the National Electronics Conference, Inc., 84 East Randolph St., Chicago 1, Ill. Price is $5.00.



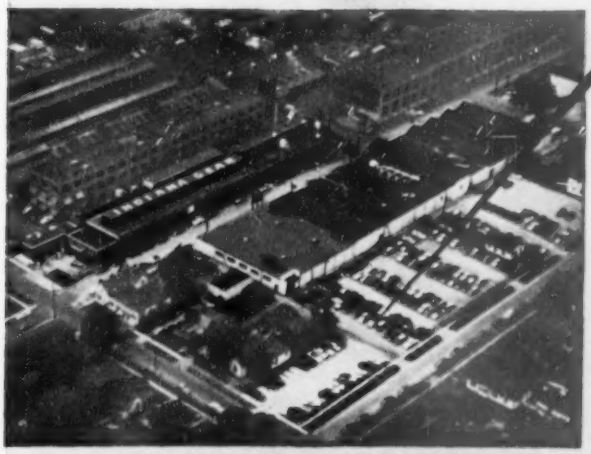
EASY-TO-READ VOLTMETER

Easy-to-read voltmeter gives voltage indication in digital form. Device will indicate d.c. voltages up to 1,000 v. with an accuracy of 0.1% or 75 mv., whichever is greater, according to manufacturer, Non-Linear Systems, Inc. Digital voltmeter indicates voltage polarity and automatically shifts decimal point. Up to 100 separate readings per second can be obtained, company says. Address: Del Mar, Calif.



Hiram Maxim's "Giant" (GB), 1894. 350 hp steam engine; 104 ft. span.

...out of this came Aviation



The manufacturing facilities of IGW at Indianapolis

An industry whose tremendous growth has forced the continued expansion of the manufacturing facilities of many companies to feed this great industry's carnivorous appetite for production.

Indiana Gear Works is such a company—we began to produce precision parts for the aviation industry in 1933.

Today, twenty years later, we find ourselves continuing to increase our physical plant in order to gain the production capacity we need to consistently produce quality precision parts and assemblies.

INDIANA GEAR

INDIANA GEAR WORKS, INC. • INDIANAPOLIS 7, INDIANA

New Delay Lines for Radar, Computers

New delay lines suitable for use in radar and computer work, have been announced by three manufacturers.

• **PCA Electronics Inc.:** Continuously variable, distributed constant, delay lines capable of providing a time delay of zero to 0.5 microseconds, with rise time as low as 0.05 microseconds at full delay. Standard lines have a characteristic impedance of 500 ohms and special lines are available with up to 1,500 ohms impedance. Unit measures 7½x1¼x½ in. (2180 Colorado Ave., Santa Monica, Calif.)

• **Advance Electronics Co.:** A time delay of one to 10 microseconds, in steps of one microsecond is available in the Type 702 delay line. Device has very rapid rise time (0.45 microseconds) and produces essentially zero overshoot, manufacturer says. Characteristic impedance is 190 ohms, both input and output. Nominal cut-off frequency is 1.27 mc. and maximum applied voltage is 500 v. peak. Dimensions are 2x8x5½ in. (P.O. Box 394, Passaic, N. J.)

• **May Engineering Co.:** Time delay of zero to one microsecond is available in five 0.2 microsecond steps with a rise time of 0.05 microseconds (measured at 10% and 90% amplitude) in this bumped-constant delay line. Characteristic impedance is 50 ohms and maximum peak voltage is 500. Dimensions are 2½x3x4½ in. 6055 Lankershim Blvd., N. Hollywood, Calif.

UAL Buys Analyzers

United Air Lines is wiring all its aircraft (DC-3s excepted) for Scintilla portable-airborne ignition analyzers. Planes involved: Convair 340, DC-6, DC-6B, DC-7 and Boeing Stratocruiser.

Order amounts to $30,000, includes nine analyzers and 432 breaker assemblies. All equipment has been delivered except the breaker assemblies. One analyzer will be located at each of these stations: Honolulu, Los Angeles, Seattle, Denver, Omaha, Chicago, New York. San Francisco, UAL's main base, will have two, one for use aboard aircraft, the other in engine test cells.

FILTER CENTER

▶ **GE Silicon Diode**—Watch for General Electric to announce soon a silicon diode featuring much higher ratios of back-to-forward resistance than germanium diodes, and suitable for high-temperature operation. Bell Telephone labs recently announced development of a silicon diode (AVIATION WEEK Oct. 5, p. 55).

▶ **Collins Installs New TVOR**—Collins Radio Co. has made an experimental TVOR (low-power omnirange) installation at the Cedar Rapids (Iowa) municipal airport where the company has a large flight test facility. Similar installation has been operating experimentally on 111.4 mc. at Red Bird Field near Dallas.

▶ **CATs Get Workout**—Air Force, Coast Guard, and Army Signal Corps are buying recently announced Wilcox Electric CATs (computing automatic trackers) for evaluation as an ILS approach aid. Company reports that it has also sold five CAT prototypes to corporate plane owners.

▶ **PCA Electronics Expands**—PCA Electronics, Inc., maker of tiny pulse transformers, is expanding its activities into the field of filament, plate, and other types of transformers and chokes. Company's address is 2180 Colorado Ave., Santa Monica, Calif.

▶ **GE Tube Warehouse**—General Electric has formally dedicated its new 25,000-sq. ft. warehouse in Los Angeles which will stock all types of electron tubes for the West Coast area. —PK

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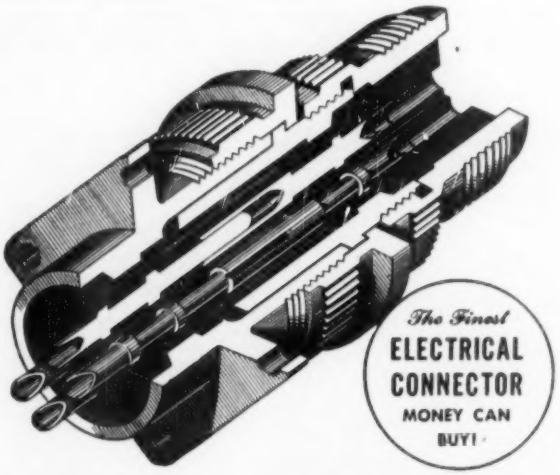
When operating conditions demand an electrical connector that will stand up under the most rugged requirements, always choose Bendix Scinflex Electrical Connectors. The insert material, an exclusive Bendix development, is one of our contributions to the electrical connector industry. The dielectric strength remains well above requirements within the temperature range of −67°F to +275°F. It makes possible a design increasing resistance to flashover and creepage. It withstands maximum conditions of current and voltage without breakdown. But that is only part of the story. It's also the reason why they are vibration-proof and moisture-proof. So, naturally, it pays to specify Bendix Scinflex Connectors and get this extra protection. Our sales department will be glad to furnish complete information on request.



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NEW AVIATION PRODUCTS

New Aids Announced For Inflight Refueling

Components for external fuel tanks, used for inflight refueling, are now being offered in packaged kits by Aircraft Controls Co., division of Corn Electric Co.

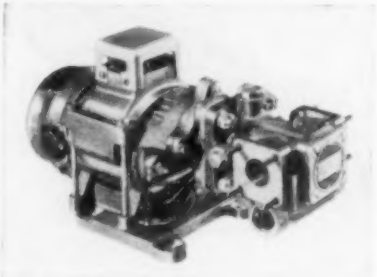
Principal units contained in the kits are a low-level limit switch, dual-level float switch and a closed-end electrical connector.

Manufacturer states that all equipment is explosion-proof and has been vibration-tested in accordance with MIL-E-5272. It has been pressure-tested to operate in tank pressure of 0 to 10 psi. at altitudes to 50,000 ft.

• **Low-level limit switch** has rating of 0.5 to 10 amp. induction load at 0-50,000 ft., is of single-pole double-throw design. It is designed to operate warning lights or actuate shut-off or by-pass valves.

• **Dual-level float switch,** rated at 0.5 to 10 amp. at 28 v. d.c. inductive load at 50,000 ft., is designed to actuate refueling level light, control relays, operating controls, shut-off valves and other units. It is subjected to extreme temperature environmental test and 100,000-cycle test, as well as tests for operation at tank pressure of 0 to 10 psi. at 50,000 ft. It is vibration-tested horizontally 10 hr. and vertically 100 hr. Unit weighs 2½ lb., measures approximately 4½ by 7½ in. with permanent 3- or 4-lead wiring.

Aircraft Controls Co., division of Corn Electric Co., Stamford, Conn.



Self-Prime Pump for Multi-Engine Lube Oil

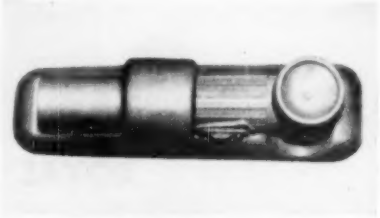
Lear-Romec is offering a self-priming, rotary-vane, positive-displacement oil pump for the transfer of lubricating oil between tanks on multi-engine aircraft.

Designated Model RG-9840, the unit has a relief valve which limits discharge to 300 psi., is adjustable to lower pressure.

Pump is operated by a 0.35-hp. geared motor, rated for continuous duty on 27 v. d.c. Motor is fully enclosed and is explosion-resistant. It is rated at 0.75 hp. at 300-psi. pump pressure, intermittent duty of 5 minutes on and 55 minutes off.

Rated capacity of the pump with oil is 2.75 gph. at 70 to 90F with 20-in. Hg suction and 50 psi. discharge. It has self-aligning mechanical shaft seal which is suitable for low-temperature operation. Ports are designed for 1-in. tubing. Unit weighs 12 lb.

Lear, Inc., Romec division, Elyria, Ohio.



Impact Will Activate Simple Flashlight Unit

A simple lightweight unit, applicable for emergency illumination inside aircraft, which can be adjusted to work automatically from any predetermined impact of 2 G to 6G, is being offered by B. K. Sweeney Mfg. Co.

The Sweeney 10001 inertia flashlight weighs less than one pound including bracket, and can be easily positioned in aircraft to light all exits and aisles without need for modifications to bulkheads, states the maker. If desired it can be hand-held like any standard flashlight. Power source is two ordinary flashlight batteries.

B. K. Sweeney Mfg. Co., Denver 17, Colo.

Lightweight Muffler Cuts Cabin Conditioner Noise

Industrial Sound Control, Inc., has come up with a small, lightweight muffler to reduce noise from air conditioning systems in cockpits of jet aircraft.

Unit measures 5 in. square by 10 in. long and weighs 3½ lb. ISC states that it will fit into air conditioning system of any existing aircraft.

Construction is of steel-lined aluminum. Muffler reportedly will provide 50-decibel high-band attenuation with over-all noise reduction up to 23 decibels. It is said to operate to temperatures of 500F. and above.

Industrial Sound Control, Inc., Hartford, Conn.

New Cessna 180

AMERICA'S FASTEST AIRPLANE IN THE MEDIUM PRICE FIELD

TWO YARD-WIDE DOORS
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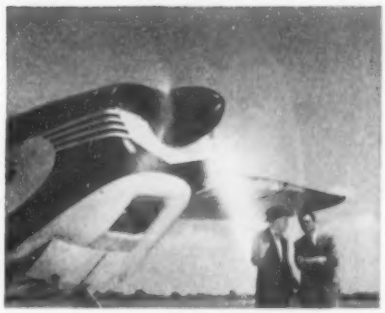

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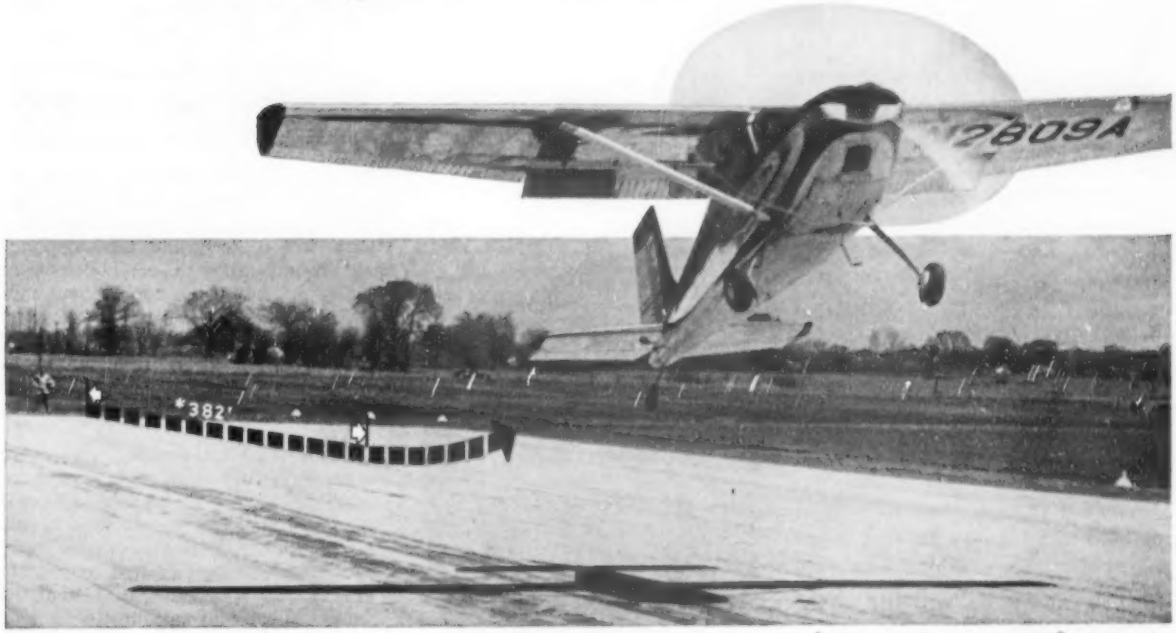

*at sea level, zero wind, 59° Fahrenheit.

Here's a luxurious, new business airplane that speeds you from the middle of the country to *either* coast in a day. Yet, it costs several thousand dollars less than any other airplane in the "over 150 m.p.h." class!

The "Golden Year" Cessna 180 is comfortable, too! . . . with soft, foam-rubber seats, plenty of room for 4 big passengers, and 120 lbs. of baggage. It's powerful . . . with a 225 H.P. engine that climbs 1200 ft. per minute yet delivers gas mileage comparable to an automobile. And, it's versatile! . . . with a rear seat that converts to a quarter-ton cargo area in just 6 minutes, 57 seconds.

If you are a long-distance business traveler, interested in saving on transportation time and expense, see the new "Golden Year" 180 at your Cessna dealer's, today. Learn how this great executive time-saver can help solve *your* transportation problems.

The Cessna dealer in your area is anxious to take you for a flight in the new Cessna 180. Consult the yellow pages of your Telephone Directory for his name and address. See him today!

Cessna 180

Cessna Aircraft Company
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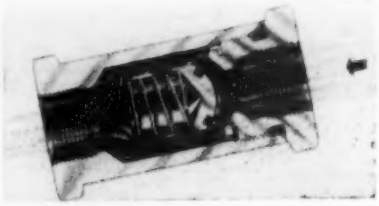

Small-Size Check Valve Has Low Pressure Drop

Low pressure drop is the big feature claimed for a new "free-flow" check valve being put on the market by Republic Manufacturing Co.

Self-aligning spherical poppet nose and matching seat are said to assure perfect leak-proof seal. Caged poppet gives the low pressure drop with practically no flow restriction in non-surge hydraulic systems to 3,000 psi., the company says.

Made in all metals, sizes ¼ to 1 in., valves are available in all combinations of tube and pipe parts for operating temperatures from −65F to 200F. Made for higher temperatures on order.

Republic Manufacturing Co., 1930 West 77th St., Cleveland 2, Ohio.

ALSO ON THE MARKET

Two-way shut-off couplings for use on ¼ to ⅜-in. pneumatic and hydraulic lines are being added to a standard HK line of ½ to 1-in. sizes. The new couplings are available in brass or steel. Operation: Upon disconnection, torpedo valve in socket contacts valve seat, providing positive seal against gas or liquid escape from socket end, while similar action is effected at plug end.—Hansen Manufacturing Co., Cleveland, Ohio.

Cleaning unit for flushing, soaking or spraying of cold metal parts, dies, bearings and assemblies has abrasive-proof pump that delivers heavy flow of solvent through a flexible metal hose. Flow can also be switched to another flexible hose with handgrip. Designated Model H-95, unit measures 5 ft. long by 3 ft. wide by 3 ft. 2 in. high.—Graymills Corp., 3705 N. Lincoln Ave., Chicago 13, Ill.

Recording instrument records in sequence the values of three variables at 20 different points. Variables include current, power, strain, humidity, liquid flow, liquid level, speed and displacement. Instrument is adaptable to any physical quantity for which a sensing element can provide an electrical output. Switching unit can be set to record from one to three variables and can be adapted to record up to 60.—Hastings Instrument Co., Inc., Hampton, Va.

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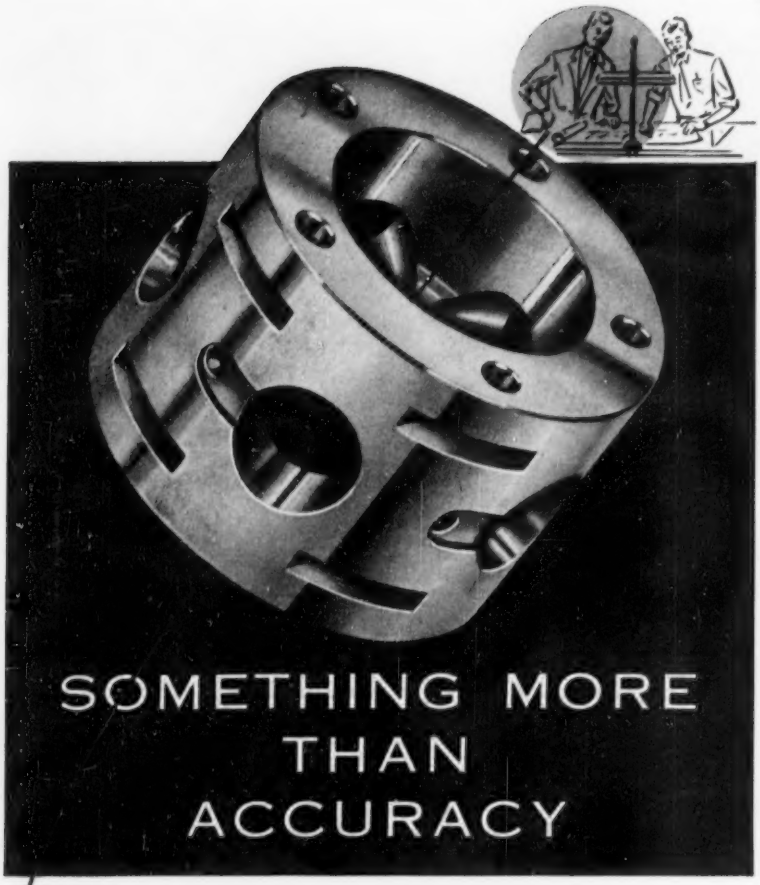

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DESIGNERS AND MANUFACTURERS OF PUMPS • VALVES • ACTUATORS

WHO'S WHERE

(Continued from page 11)

Changes

Victor A. Spoehr, vice president-general manager of H. M. Harper Co., Morton Grove, Ill., has been appointed director of the General Components Division, National Production Authority.

William R. Stanton has become personnel director of Servomechanisms, Inc., Westbury (N. Y.) Division.

G. Jack Miller has been appointed assistant to the manager of Pan American World Airways' Miami, Fla., overhaul base. **Albert L. Fish** is new industrial engineer.

Charles C. Gaudio has been named assistant general manager of the Air Express Division, Railway Express Agency, New York.

Preston Hopkins has been appointed manager of Continental Air Lines' communications center in Denver.

Samuel E. Beal is new manager of the Aviation Division, Oakite Products, Inc., New York.

William J. Cunningham, onetime manager of government contracts negotiations for Dumont Aviation Associates, has become assistant sales manager for industrial hydraulic accumulators and components at Greer Hydraulics, Inc., New York.

C. C. Hurlburt, who resigned recently as chief standards engineer for Piasecki Helicopter Corp., Morton, Pa., has joined P. R. Mallory & Co., Indianapolis.

Bert M. Harsh has been promoted to assistant manager of Hawthorne School of Aeronautics, Moultrie, Ga., succeeding **Kenneth V. Brugh, Jr.,** who resigned as vice president-general manager.

Robert G. Gustavson has joined Pastushin Aviation Corp., Los Angeles, as project engineer in charge of jettisonable fuel tanks, external stores and mechanism design.

Bruce C. Elliott is chief of Axelson Manufacturing Co.'s new market research department, which includes aircraft activities.

J. D. Meyer has been promoted to sales manager of landing gear and airframe equipment for Bendix Aviation Corp.'s Products Division, South Bend, Ind. **S. R. Craig** has become sales manager of fuel metering and engine equipment.

Aaron M. Krakower is sales manager of General Electric Co.'s new specialty transformer department at Schenectady, N. Y., with products that include high-voltage transformers for jet aircraft. **David J. Jay** has joined GE's Carboloy department, Detroit, as a product and process development engineer.

H. A. Holmburg has resigned as manager of subcontracts for Kaiser Metal Products, Aircraft Division, Bristol, Pa.

Frank McGraw has become personnel director of Pastushin Aviation Corp., Los Angeles.

Harlow D. Adkins has been promoted to assistant chief engineer of Kearfott Co., Clifton, N. J. **Robert C. Rosaler** is new chief of the mechanisms laboratory.

Prof. Wilbur C. Nelson has been appointed chairman of the Department of Engineering at the University of Michigan's College of Engineering, Ann Arbor.

WATER

WHEN AND WHERE REQUIRED FOR THE SUPER CONSTELLATION

PASSENGERS aboard Lockheed's luxurious Super Constellation naturally *expect* a dependable and ample supply of clean water. Thanks to Lear-Romec's efficient turbine water pumps, they get it. And along with these niceties for passengers, comes a break for maintenance personnel. Utilizing pressure feed instead of gravity, tanks are installed below the floorboard, making for simple servicing. The compact pump mounts vertically on the under side of the water tank, with all plumbing and electrical connections exposed for easy access.

The Lear-Romec pump illustrated is a submerged turbine-type water utility pump. It is one of a series available in AC and DC motor drive, originally developed for military aircraft, and produced by Lear-Romec for the past ten years. Weighs 2.8 pounds less than equivalent model vane-type pumps. Similar turbine type pumps are also furnished by Lear-Romec for aircraft engine water injection systems.

Bring your pump problems to Lear-Romec—*specialists* in aircraft fluid system components.

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ABBE ROAD, ELYRIA, OHIO
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LEAR-ROMEC MODEL RR-9700-A A fully submerged type turbine aircraft pump. Supplies wash water or anti-detonant solution. Nominal rating 110 gph at 35 psi discharge. Adjustable in range to 25 psi at 150 gph. This unit is 27 volt DC, 11 amps. continuous duty, and has integral radio noise filter on the motor. Weight 5.68 lbs.

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Airways Fee Would Slash Carrier Profits

- **User charge would cost airlines $21,250,000.**
- **ATA says they should pay only $12 million.**

By Lee Moore

Airways user charges tentatively proposed by Civil Aeronautics Administration would slash at least 20% off domestic trunk airlines' annual net profits, if the President and Congress go along with the recommendation.

CAA proposes a fee of 2¼ cents a gallon on aviation fuel consumed in domestic civil operation, effective from next July 1 forward. This would be an addition to the existing avgas tax of 2 cents a gallon.

The user charge would cost scheduled domestic airlines about $21,250,000 in fiscal 1955 and all other domestic civil users about $4 million. International operations would be exempt from the user charge.

CAA prepared this study and recommendation primarily for Commerce Department and Budget Bureau consideration. It is a preliminary report only, being circulated now for government and industry comment, CAA says.

▶**ATA Opposition**—Air Transport Assn. already has ripped into the basic assumptions and statistical methods and logic of the CAA report. A critical letter to CAA administrator Fred Lee, with a copy to Commerce Undersecretary for Transportation Robert Murray, will be followed by a detailed ATA study and rebuttal soon.

ATA figures that domestic scheduled airlines' airways use responsibility comes to about $12 million a year, instead of the $21 million proposed by CAA for next year and the theoretical $29 million that CAA computes as the carriers total share of cost and value of service.

Main CAA authors of the study are chief economist Richard Waldo and program coordinator Joseph Blatt. Waldo told AVIATION WEEK that industry comments already are turning up "weaknesses" in this CAA report.

▶**CAA Program**—Here are highlights of the recommended program:

• **Domestic airways service cost** in fiscal 1952 was a little more than $75 million, including operation and amortization of all domestic CAA airway and airport facilities.

Impact of Proposed Gas Tax Increase On Airways Users

	If increase per gallon is:		
Cost per year:*	2 cents	2¼ cents	3 cents
Scheduled airlines	$17,000,000	$21,250,000	$25,500,000
Other operators	3,200,000	4,000,000	4,800,000
Total	**$20,200,000**	**$25,250,000**	**$30,300,000**

Source: CAA's program of charges for the use of federal airways system proposed for industry and government comment.
*Based on estimated U. S. Treasury receipts in fiscal 1955 from these alternate tax increases per gallon.

• **Domestic civil user share** of that $75-million comes to $30 million from scheduled airlines and $27 million by other civil users. Thus, airlines get 59% of the total units of service rendered to civil airways users alone.

• **Straight levy** on gas consumption makes airlines foot more than 80% of the user charge. So airlines would pay nearly three times as much as other civil users for the same unit of the service, by interpolation of CAA's own calculations.

• **Airline cost increase,** estimated by CAA at $21,250,000 at 2¼ cents a gallon, compares with a current domestic trunk airline earnings level of about $100 million a year before income tax, $50 million after tax. Assuming continued earnings at that general level, the proposed gas levy would cut operating profit of $80 million and net profit of $40 million, or roughly a 20% earnings cut. If profit margins slumped due to business recession, the gas levy bite would be much more than 20% of airline earnings—and could make the difference between profit and loss.

• **U. S. Treasury increase** would not be the full $25,250,000 yield of the gas levy in fiscal 1955. Net yield to the Treasury would be about $15 million, because the pre-tax gas levy would cut aircraft operators' income tax by approximately half the amount of the user charge.

Airways Cost

	Annual cost*	User share
Scheduled airlines	$30 million	39%
Other civil	20 million	27
Military	26 million	34
Total	**$76 million**	**100%**

* As measured by actual CAA count of individual facilities costs and units of service rendered users by each in fiscal 1952.

Source: CAA's program of charges for the use of the federal airways system.

▶**Cost Allocation Method**—CAA starts its user-charge analysis by allocating the $75-million airways cost by users' relative utilization of each major airways component.

This is a straight count of facilities cost and how much each is used by the three types of user—military, airline and other civil operator. This basic count is quite accurate. Example: Airport control tower operation costs CAA $13 million a year. Airlines make 28% of the takeoffs and landings controlled by those towers. Thus, airline responsibility for cost is $3,750,000 a year.

CAA count of all facilities and relative amount of use by each type operator shows airlines responsible for 39% of total cost, other civil operators 27% and military 34%.

The agency criticizes this straight cost breakdown on grounds that it would be "extremely burdensome" for a small aircraft owner to pay the same rate as the commercial operator for the same unit of service. Second CAA criticism of straight cost allocation is that airways are laid out more for benefit of airlines than other operators.

As an offset to the alleged drawbacks to straight cost allocation, the program coordinator and co-author of the study, Joseph Blatt, proposed blending in of a "value of service" allocation. This concept presumes that a given unit of service to a 50-passenger airliner is more important and hence more "valuable" than the same unit of service rendered a three-passenger Navion.

The study, therefore, "weights" the straight cost allocation by the gross weight of the different type planes receiving the service. This revises the

cost allocation to 62% airline, 4% other civil and 34% military.

CAA tempers this by splitting the difference between its weighted allocation and the straight cost allocation. Result of this entirely arbitrary final compromise is assignment of 51% of the airways cost to airlines, 15% other civil and 34% military. By coincidence or design, that is about the ratio that the gas levy would yield.

▶ **Ability to Pay**—Applying that combination cost and "value-of-service" ratio to airlines and other civil operators, CAA assigns about $29 million of annual domestic airways service responsibility to the domestic scheduled airlines.

That appears too steep for the first year, so the proposed charge for fiscal 1955 is lowered to $21,250,000—the expected airline yield from a fee of 2¼ cents a gallon of fuel consumed.

▶ **ATA Approach**—ATA starts with the same $75-million annual airways cost that CAA computed, although the organization maintains it should be about $2 million less. ATA then assigns an arbitrary one-third of the airways value as defense standby value. That leaves $50 million to be divided among users according to their fair share.

Airways equipment and personnel level is determined by peak load, ATA says. Thus, the establishment and operation are geared to the high level of weekend traffic—military reserve flying, private flying and busy airline operation. At peak load, the association says, CAA renders only 25% of its service to the scheduled airlines (as compared with the overall yearly average of 39% calculated by CAA).

Thus, ATA reasons, scheduled domestic airlines are responsible for about $12 million of the annual $75-million airways cost. They already pay about that by the existing 2-cent gas tax. Thus, the airlines are paying their way now.

▶ **ATA Criticism**—ATA's immediate response to the 136-page CAA study was a two-page letter to administrator Lee, hitting:

• **Rail vs. air.** The air carrier association says rail and highway users get free public transport. (CAA said they paid substantial user charges.)

• **High fees.** ATA describes the proposed levy as "so onerous and excessive as to endanger the continued development and financial stability to the industry."

• **Military.** ATA criticizes the CAA approach for assigning no value to the military standby value of the airways, "an intergral part of the air defense system."

• **Discrimination.** The air transport group hits the "value-of-service" weighting that CAA gave the cost allocation—resulting in an airline paying three times as much as other civil operators for an identical service. "The selection of the airlines for special adverse treatment on this occasion is, in our opinion, unconscionable," ATA says.

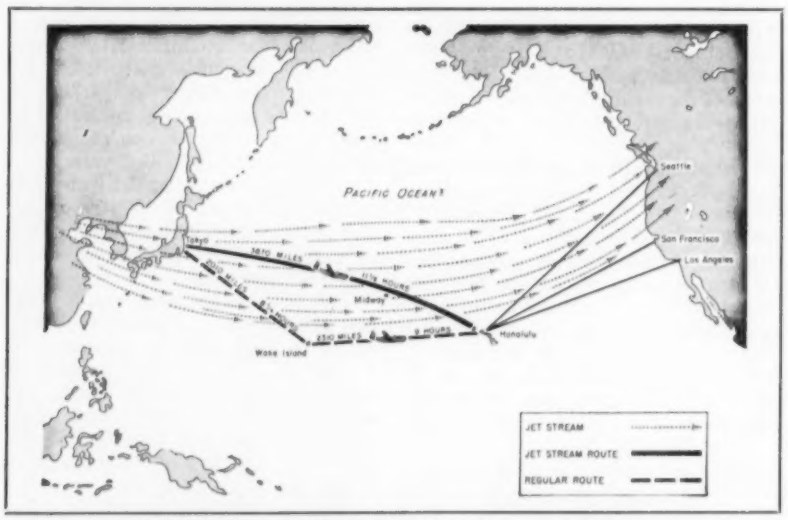
• **Airline cost to CAA.** ATA says the report gives no credit to airlines for the fact that their operations are scheduled and predictable, thereby lightening the load on CAA airways operation. Also, airlines demand less help than private operators on any given CAA facility, because the carriers generally are better equipped and more competently manned. (CAA's basic cost allocation figured units of service, counting an airline ILS approach as the same cost as a private flyer's ILS approach.)

• **No gas-tax credit.** The organization points out that the present 2-cent gas tax yield from domestic scheduled airlines is $12 million a year now and will increase at about $2 million a year as fleets grow. (CAA said that existing excise tax is a general revenue measure—not a user charge.)

▶ **Observer Comments**—Washington observers going over the CAA study found certain other inconsistencies in the report.

CAA weighted the civil charge against airlines partly on grounds that airways were laid out more for carriers than other civil operators. But CAA refused to weight any additional cost against defense use, also a prime consideration in the airways layout.

Observers also questioned the CAA hypothesis that airlines can afford to pay more than non-airline operators for an identical service.



HOW PAA FLIES PACIFIC JET STREAM

Pan American World Airways has started flying winter jet stream pattern (above) over the Pacific, which enables its Boeing Stratocruisers to average approximately 346 mph. from Tokyo to Honolulu and bypass the normal fuel stop at Wake Island. Utilizing the 100-mph. tailwinds encountered in the jet stream at 17,000-25,000 ft., the Stratocruisers can cut approximately seven hours from the normal Tokyo-San Francisco/Los Angeles schedules. This flight pattern is operated from Nov. 1 through Mar. 15 when the jet stream apparently moves to altitudes above the reach of the Boeing transports. This winter marks the second year PAA has used the jet stream technique. Experience and increased knowledge since last year have enabled the carrier to extend its winter schedules by two months. From Mar. 15 to Nov. 1 PAA will return to the Tokyo-Wake-Honolulu route previously followed.

TWA Boosts Super Connie Order to 20

Trans World Airlines has signed a contract with Lockheed Aircraft Corp. for 12 additional Turbo Compound-powered Super Constellations, boosting its total order for the transport planes to 20.

TWA is spending approximately $45 million for the 1049Es, scheduled for delivery beginning in February 1955 and concluding in June.

The airline is expected to assign eight of the Super Connies to trans-Atlantic services and the other 12 to domestic routes.

The new order will make TWA the largest single Connie operator in the world with a total of 98.

Lockheed now has sold 132 Super Constellations to 18 airlines, and its commercial backlog has increased approximately $160 million—a new peak. The manufacturer has built or has on order a total of more than 500 Connies. Negotiations with four foreign carriers are nearing completion, the company says.

NYA Plans Expansion With New Heliports

With more than 281,000 mi. of scheduled helicopter experience, Robert L. Cummings, Jr., president of New York Airways, says building suitable heliport facilities in Manhattan and Brooklyn is "the most important single step now required" for full utilization of his Skybus service.

A number of plans for construction of permanent facilities are under way, Cummings reports. He believes that with their establishment, service could be inaugurated within weeks between the New York area, neighboring communities and the airports.

Commenting on NYA's recent first anniversary, Cummings says the carrier has flown approximately 3,112,400 lb. of mail and 102,000 lb. of cargo. The 1,000th passenger was flown on NYA's birthday last month. Skybus service has logged 4,700 flying hr., with the airline's oldest S-55 accounting for 1,700 hr.

The copter carrier's chief executive sees these specifications as best fitting his operation: twin-engine 20-passenger helicopter with single-engine performance, and with 125-mph. cruising speed. Although higher speeds might be desirable for longer hauls, Cummings believes NYA's helicopters should not fly faster than 125 mph. because stages are relatively short and the cost of higher speed would be outweighed by disproportionately higher costs. NYA now serves 32 communities from Bridgeport, Conn., to Trenton, N. J.

Jetliner Fight

Ottawa—British aviation authorities charge that Trans-Canada Air Lines has refused to buy Avro-Canada's Jetliner, designed and built on order for the carrier.

TCA president G. R. McGregor replies that his airline signed no formal contract for the turbine transport and says Trans-Canada turned down the plane because the Jetliner's "complexion" had changed completely by the time Avro produced a prototype.

But the British authorities say Avro bettered TCA's specifications of a 32-passenger jet transport with a range of 600 mi., building a plane capable of carrying between 52 and 64 persons up to 1,500 mi.

The Canadian government paid 75% of the cost of constructing the Jetliner prototype and Avro footed the balance, the authorities report.

CAPT. SHINN: Korea's air transport hope.

Korea Line Gets First Trans-Pacific DC-4

Capt. Y. W. Shinn, pilot president of Korean National Airlines, last week ferried his carrier's first DC-4E from Oakland (Calif.) Airport to Seoul for the start of trans-Pacific service by the end of this year.

Shinn says KNA plans to expand the new San Francisco-Seoul service in 1954 by acquiring two Super Constellations, one on May 1 and another Dec. 1.

▶ **$1,000 Fare**—Negotiations now are under way for Civil Aeronautics Board approval of the route, expected to be granted in a reciprocal acknowledgment of Northwest Orient Airlines rights in Korea.

Because his airline is not a member of the International Air Transport Assn., Shinn expects to charge a round-trip coach fare of about $1,000.

Korean National will schedule the DC-4 on weekly flights to Tokyo and probably to Hong Kong until the Seoul-San Francisco service is approved, the carrier's president says.

▶ **Copter Feeder Flights**—Shinn bought the DC-4 from California Eastern Airways, which converted it for 48-passenger luxury service and added berths to sleep four. He also purchased a Hiller UH-12B helicopter for feeder and mail contract flights.

KNA previously owned three DC-3s, putting two into service during the winter of 1950 and flying them throughout the Korean war. The third was added last June.

The twin-engine transports maintained daily service between the major South Korean cities, using military fields and scheduling take-off and landing times for early morning or late at night to avoid interference with bombing missions.

The planes never were attacked and had no accidents.

▶ **First Korean Pilot**—The peppery 52-year-old KNA president, who also is chairman of his nation's House of Representatives, was the first Korean to learn to fly. He was trained in Japan in 1921 and is credited with upwards of 12,600 flying hours.

Shinn also is Korea's first helicopter pilot. While in California he learned to fly Korean National's UH-12B, soloing in 10 hours instead of the more usual 30.

Before World War II, he was president of the Korean Aviation Co., which had a fleet of 20 two-engine planes of various makes. These planes were confiscated by the Japanese and returned in 1945. But the U. S. ordered the fleet destroyed, because it was feared they would be flown into North Korea and cause trouble with Russia.

In 1949, Shinn formed a new company and bought three Piper Stinsons, only to have these confiscated by the South Korean army during the Communist invasion.

▶ **Sturdy Condition**—His company now is in sturdy financial condition. Load factors in the 28-passenger DC-3s have averaged 95% and loans obtained to buy them have been paid off.

KNA employs about 100 persons, including 11 American pilots. Airline headquarters presently are in Pusan, but a move to Seoul is planned in the near future.

CAB ORDERS

(Oct. 19-25)

GRANTED:

Central Airlines permission to start service to Chickasha, Okla.

Rhinelander Airways permission to keep its "airways" name. CAB regulation prohibits use of "airlines" or "airways" by air taxi operators, but Rhinelander has used that name since 1926.

Mohawk Airlines permission to alter its service pattern, omitting certain stops at Auburn-Geneva, Rochester, Buffalo, Ithaca, and Syracuse, N. Y.

West Indies Airways (San Juan) permission to serve Culebra, Humacao, Vieques, Yauco, San German and Perguera as an air taxi operator.

Central Airlines permission to suspend service at Chickasha and Duncan, Okla., until airports are improved.

APPROVED:

Routine inter-airline contracts among 27 groups of parties.

American amendments to Air Transport Assn.'s articles on: free balance transfer from one account to another, board of directors membership, and levying of fines for late dues payment.

North Central Airlines contracts with Purdue Research foundation, University of Aeronautics Corp.

DISMISSED:

Frontier Airlines request to stop service to

Winslow, Ariz.—withdrawn by the company.

Braniff Airways application for direct Dallas-Tulsa service—withdrawn by company.

DENIED:

Trans-Caribbean Airways' fourth request for reconsideration of "additional service to Puerto Rico case" or for special exemption to operate such service without certification. CAB says latest request "borders on the frivolous."

CONSOLIDATED:

Allegheny Airlines inclusion in investigation of what to do with Lake Central Airlines routes. Other possible acquirers: Ozark Airlines, Transport Airgroup, Inc., and North Central Airlines.

FIXED MINIMUM RATES:

Airfreight 20 cents per ton-mile for first 1,000 and 16.25 cents for each ton-mile in excess of 1,000 on same shipment.

SUBPOENAED:

Records of Paul Mantz Air Services, airline ticket agency.

AMENDED:

Pan American World Airways trans-Atlantic route transfer case, in which PAA bought American Overseas, to provide that CAB employe protection rules apply to seniority of mechanics with respect to Pan American's contract with the Transport Workers Union (CIO).

Airfreight Tariffs To Increase 12%

Domestic airfreight rates will increase an average of 12% by Nov. 20 or before, following withdrawal of objections by American Airlines and others to a tariff boost proposed by Civil Aeronautics Board.

The final Board order increases the established minimum rates by 25%. Many tariffs already were substantially above the minimums. CAB estimates the effect of the increased minimums will be a 12% average increase.

Special below-minimum rates will be raised to maintain their previous percentage relationship to the minimum rate.

Basic minimum now becomes 20 cents per ton-mile for the first 1,000 and 16.25 cents for each ton-mile in excess of 1,000 on any one shipment.

American opposed the increase as originally proposed by Slick Airways, seconded by Flying Tiger Line and issued as a show-cause order by Civil Aeronautics Board.

Slick contended that, due to higher expenses, the present rates produced marginal to loss returns on all-cargo service despite high load factors. American replied that the old rate was adequate for lower-cost service in cargo compartments of passenger planes.

The rate, AA argued, should not be increased merely to provide profits for the minority of carriers that could not show a profit at the current airfreight rates.

FUTURE HOME of NWA's executive offices in NYC, near airline's biggest market.

NWA Executive Move Planned for January

Northwest Orient Airlines plans to move into new executive offices in New York in early January. General offices will remain in St. Paul (AVIATION WEEK June 15, p. 92). Only eight top company executives are involved in the move.

Two reasons are given for the switch:

- **NWA executives** will be freed of routine administrative tasks and allowed to concentrate on top policy planning.
- **New York** has passed Twin-Cities and Seattle as the carrier's biggest market.

Eight officials involved in the move are H. R. Harris, president; L. C. Glotzbach, Willis Player, E. I. Whyatt and J. W. Mariner, vice presidents; C. L. Stewart and Dale Merrick, assistant vice presidents; and H. D. Reynolds, executive assistant to the president.

Location of the offices will be a five-story building at 537 Fifth Ave., between 43rd and 44th Sts. Plans call for a ticket office on the street floor, while executives and their staffs will be housed on the upper four stories.

General offices in St. Paul will be headed by Malcolm McKay, vice president in charge of the Continental Division. Maintenance base also will remain at St. Paul for the present, an NWA official reports.

Manila Heliport

Manila International Airport is slated to get the first heliport established in the Philippines. The facility will meet the safety requirements of the United States and the International Civil Aviation Organization, say the Philippine Civil Aeronautics Authority and Philippine Air Lines, which will begin operating Hiller helicopters this month. PAL has had two helicopter pilots trained at the Hiller plant in California and has five other crew members taking instruction in Manila.

Australian Overseas Air Traffic Gains 11%

(McGraw-Hill World News)

Melbourne—Substantial gains in international air traffic were achieved by Australia's airlines in the past fiscal year, but domestic carriers registered a definite decrease in all business but airfreight—and that rose only 1% higher than the previous year.

Drop in domestic operations is attributed to two factors:

- **Mild recession** during the greater part of the period.
- **Long period of bad weather** throughout Australia last year.

Indications are that business is picking up. Domestic carriers started to recover during the final quarter of fiscal year ended June 30.

International airlines carried 48,000 paying passengers during this period, a 11.4% increase over the previous fiscal year. Route miles went up 6.6% due mainly to inauguration of service from Sydney to Johannesburg, South Africa.

Domestic lines carried 109,910 fewer passengers than during the 1951-52 period, a 5.9% decrease. Passenger-miles dropped 6.4% to 697,906,005. Flying hours declined 8.1% and passenger load factor slipped from 65.4% to 64.2%.

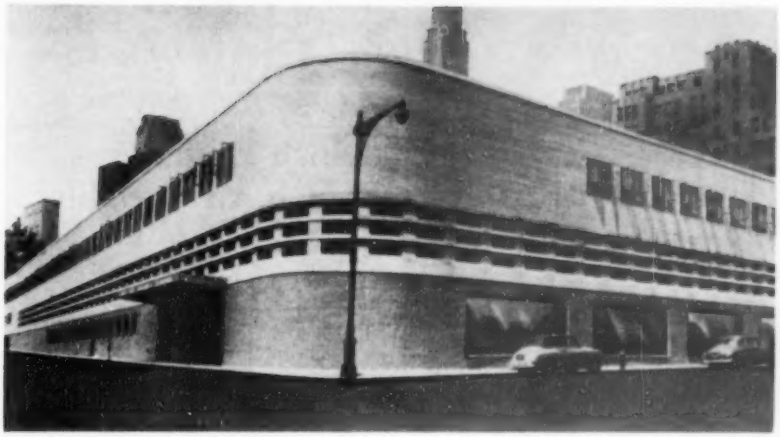
The two major Australian domestic airlines accounted for five-sixths of the passenger traffic. Trans-Australia Airlines flew 646,226 passengers and Australian National Airways handled 567,889. Of the total of 58,712 long tons of cargo flown domestically by all airlines in Australia, TAA accounted for 16,256 and ANA flew 33,041.

P.O. Reorganizes Airmail Field Service

Postmaster General Arthur Summerfield has streamlined and strengthened the field service of his airmail organization.

He has replaced the old setup of 15 local superintendents with three "regional directors" of air service. The regional chiefs will report direct to the Washington director of air service, Earl Wadsworth, in Assistant Postmaster General John Allen's Bureau of Transportation.

Washington observers saw this as somewhat parallel to the new Civil Aeronautics Administration trend to fewer field men with more responsibility and less regional red tape.



NEW YORK'S $7-MILLION airline building nears completion for opening next month.

New Terminal to House 20 Lines

By Frank Shea, Jr.

New York's $7-million East Side Airlines Terminal, originally scheduled for completion Nov. 1, now is slated to open its doors in early December.

The terminal will consolidate airport transportation activities of 20 domestic and international carriers, currently spread over 11 Manhattan departure stations that handle an estimated total of 6,500 to 7,000 passengers each day.

▶ **Traffic Solution**—Taking up the entire block, it is conveniently located alongside the Queens Midtown Tunnel—artery through which all buses will travel to and from La Guardia and Idlewild International Airports.

Providing the solution to traffic snarls that often held up coaches as much as an hour, the new location cuts running time to 27 min. for La Guardia and 35 for Idlewild.

A west side terminal, in the works for 1954, will allow coaches to make the run to Newark Airport in about 22 min. Until then, running time from the east side will be about an hour. All bus service from both terminals will be handled by Carey Transportation, Inc.

▶ **10-Line Operation**—East side terminal was built and is owned by the Triborough Bridge and Tunnel Authority, an agency of New York City, but is leased by a company formed by 10 U.S. carriers and known as the East Side Airlines Terminal Corp.

FSATC will operate and maintain the entire property on a 20-year lease, with option to renew for five more years. Airlines that make up the corporation: American, Eastern, Pan American, Trans World, United, Capital, Colonial, National, Northeast and Northwest Orient.

▶ **51,500-Sq. Ft. Garage**—In addition to location, the new terminal offers these advantages:

• **Unusual ramp** arrangement will enable buses to drop off and pick up passengers directly behind facilities of individual airlines.

• **Basement garage**—51,500 sq. ft. of service, storage and overhaul space—will handle 90 buses.

• **Two interior roadways** have been built for taxis.

• **Entire roof** has been allocated as a parking area for private cars.

Other features include: year-round air-conditioning, a 25,000-sq. ft. lobby, upper concourse for foreign flag carriers, restaurant and cocktail lounge and shop facilities.

Foreign flag lines housed in the terminal include: Air France; British Overseas Airways Corp.; El Al Israel Airlines; LAI, Italian Airlines; KLM Royal Dutch Airlines; Sabena, Belgian Airlines; Scandinavian Airlines System; Swissair; Trans-Canada Airlines and LAV, Venezuelan Airlines.

▶ **Passenger Dispatch**—More than 500 lineal ft. of counters are built around the lobby or rotunda, affording ample space for checking and dispatch of passengers and baggage.

Airlines will slide weighed-in baggage through openings directly behind their counters into a room fronting on the coach deck. Carriers on upper concourse will place baggage on conveyor belts, which transfer it to elevators.

▶ **Four-Story Structure**—Construction of a terminal on the west side for service to Newark Airport will begin sometime next year.

Architects have drawn up the plans, leases have been signed and final approval from city departments has been obtained.

Like the East Side Terminal, it will have easy access to a main traffic artery—the Lincoln tunnel. Plans call for a four-story-and-basement structure.

Land and building will be privately

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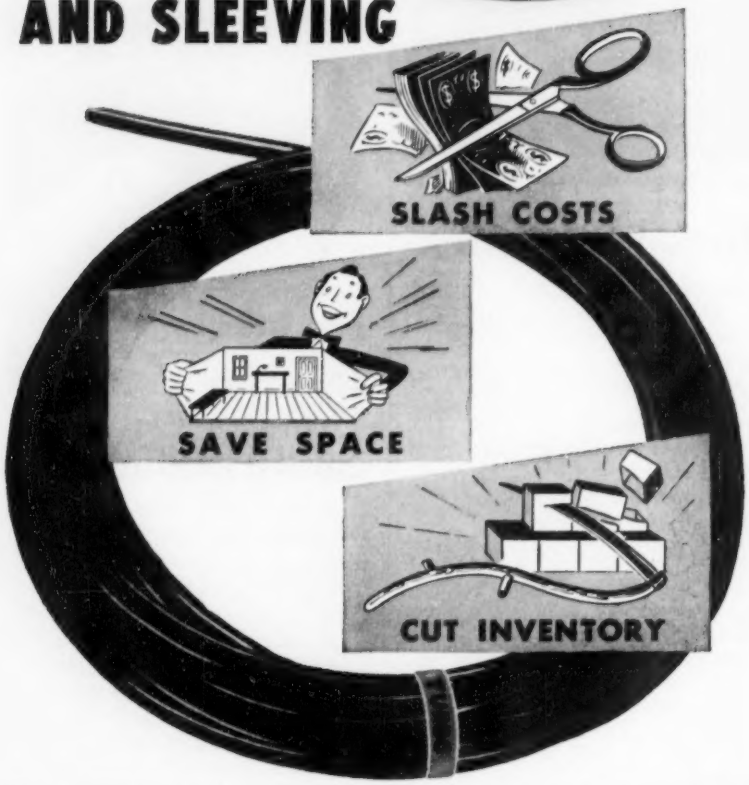

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owned by the 10-42 Corp. and leased by the West Side Airlines Terminal Corp., formed by officials of Allegheny, American, Eastern, Mohawk, Northwest, Trans World and United.

British Evaluate French Air Freighter

Silver City Airways is considering suitability of the large four-engine French Breguet Deux-Ponts freighter for its cross-Channel ferry services.

Evaluation is based on operational experience gained by the British carrier during a three-month test of the plane, carrying bulky cargo on the Berlin-Hamburg airlift.

Silver City reports that the Deux-Ponts' fuel consumption is better than the manufacturer claims.

The airline flew the 50-ton Breguet for 240 hr. and made 127 roundtrips, carrying 170,000 lb. of freight in 12 daily flights near the end of its trial. Freight was flown only from Berlin to Hamburg.

Average load for the plane was 28,250 lb. and the total carried came to nearly 4 million lb. The Deux-Ponts flew the 152-mi. stage in 52 min., compared with 63 min. taken by the twin-engine Bristol Freighters that make up the airline's fleet. The French transport accomplished the work of 3.25 Freighters, permitting the carrier to release some Bristol transports from work in Germany for use on its English Channel services.

PNYA Approves Work At Two Airports

Installation of duplicate electric power distribution systems for the instrument approach runways at New York International (Idlewild) and Newark Airports has been approved by the operator of the terminals, Port of New York Authority.

The new power system will serve Runway 4-22 at each airport and also will serve landing aids installed when the runways are made bi-directional.

Cost of the Idlewild installation is estimated at $186,500; the Newark system will cost approximately $119,410. The latter installation is to be made next spring.

Contract awards made by PNYA commissioners for work at the air terminals include $121,925 to I.T.E. Circuit Breaker Co., N.Y.C., for purchase of switch gear for the primary substation at Idlewild; $31,890 to Emjay Maintenance Engineers, Rutherford, N. J., to install a protective coating on the outside walls of the steel and hollow-tile Brewster hangar and its pump house at Newark Airport.

SHORTLINES

▶ **Braniff Airways** DC-6 aircoach service to Cuba, Central and South America is scheduled to start today (Nov. 2).

▶ **British Overseas Airways Corp.,** this week started winter trans-Atlantic schedules with eight first-class and three coach flights per week. . . . Company recently ushered in the Bermuda season, replacing one first-class Stratocruiser flight with three Constellation aircoach trips per week from New York at $95 roundtrip. . . . Chairman Sir Miles Thomas predicts that a "jet reaction airliner" with near-vertical lift for takeoff and landing "may be nearer than some folk imagine" and that atomic-powered flying boats will come "in the next 25 years or so."

▶ **Central Airlines** started Oklahoma City-Dallas service following Continental Air Lines' failure to win federal stay of the CAB route award.

▶ **International Civil Aviation Organization** reports Australia is the 20th nation to sign the Rome Convention of 1952 standardizing liability rules on aircraft-caused damage in foreign territory.

▶ **North Central Airlines** September load factor was a record 51%, carrying 23,369 passengers—32% above year ago.

▶ **Northwest Orient Airlines** reports a passenger load factor of 63% for September, compared with 68% during the same period of 1952. Passenger-miles totaled 82,387,870, a 10% increase.

▶ **Philippine Air Lines** last week stopped service to Tel Aviv and started flying to Beirut because of poor communications facilities on the Karachi-Tel Aviv route.

▶ **Pioneer Air Lines** has asked CAB for an effective mail and subsidy rate of 50.72 cents per plane-mile from Oct. 12 forward, with temporary break-even interim pay of 46.72 cents.

▶ **United Air Lines** added Cleveland to its transcontinental DC-6 aircoach service Nov. 1. . . . Company's 262,187,000 revenue passenger-miles in September topped year ago by 9%. Mail was off 14%, freight up 8% and express down 2%. September passenger volume was 4% less than the previous month. . . . United's forced suspension of service to Rock Springs, Wyo., in favor of local service carrier Frontier Airlines is recommended for continuance by CAB Examiner Ferdinand Moran.

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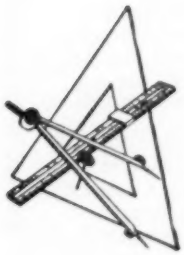

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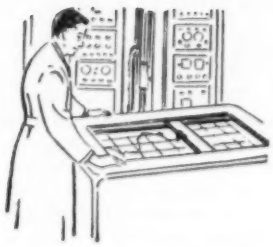

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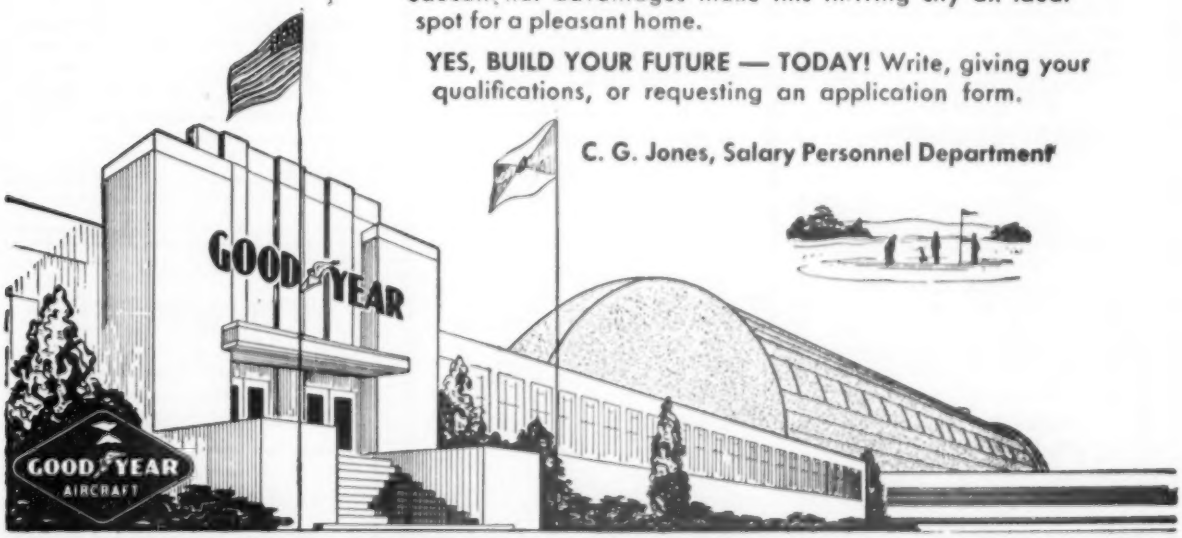

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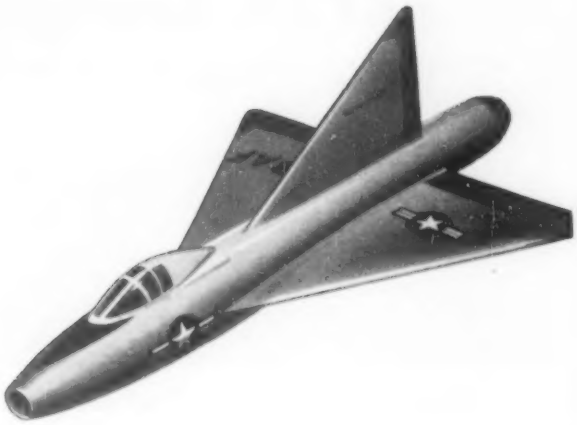

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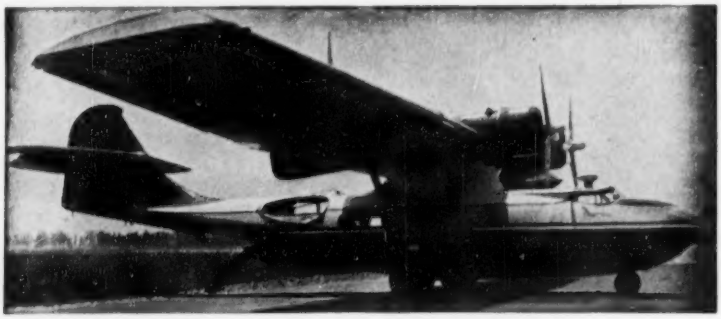

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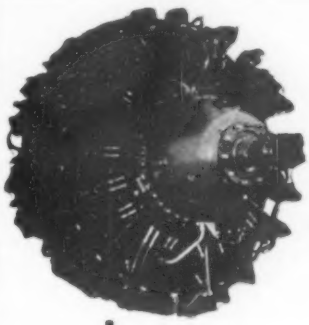

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NEWS SIDELIGHTS

General Electric, originally selected to supply the armament for Convair's new XB-58 supersonic bomber (AVIATION WEEK Aug. 31, p. 11), has bowed out as the result of its inability to work out satisfactory contractual terms and profit margin with Convair under the new weapons system management plan. Convair reportedly is negotiating with Emerson Electric and Sylvania to provide the XB-58 armament.

Greater power than any other turboprop powerplant under development is claimed for a new Wright engine by W. H. Ziegler, project engineer in Wright Aeronautical Corp.'s turboprop development group. Ziegler says the gas generator unit of the new engine is highly developed, but because of security declined to give further details. He said the control problem is the biggest reason for current lack of advanced turboprop engines in this country. Paper he presented to IAS meeting in New York was prepared in collaboration with E. F. Heaton and C. S. Constantino, WAC engineers.

American Airlines people contend privately that flap difficulties had nothing to do with the recent crash of an AA Convair into radio towers near Albany. Difficulties in lowering flaps on Convairs have been reported occasionally in the past, but Convair operators say the plane, like other transports, can be landed safely without flaps.

Piloting his own AD-Q4 radar countermeasures version of the Douglas Skyraider, Rear Adm. Apollo Soucek, chief of Navy's BuAer, left last week on a two-week inspection tour of aircraft plants located in the West and Midwest.

Aktiengesellschaft fur Luftverkehrsbedarf is new name of the revived German Lufthansa, according to the carrier's New York agent, A. E. Ulmann & Associates, Ltd. Cable name of new company is Luftag.

Recent expansion of engineering staff at Ryan means the San Diego firm is making a determined bid to get back into the airframe business. It also has an interest in the missile field.

Thomas L. Grace, president of Slick Airways, took a public swing at the attitude of American and other passenger lines toward airfreight. Said Grace: "They have not been willing to invest substantial sums in airfreight activities. American finally invested in DC-6As, but only after Slick had put the DC-6As in service and American for competitive reasons felt obliged to follow. The passenger lines were reluctant to put serious effort into the development of airfreight in 1946. They are still dragging their feet."

Convair sources say the major hurdle in ironing out "bugs" in the XF2Y Sea Dart appears to have been cleared. The trouble has not been with the hydroskis.

Gen. Nathan Twining, USAF Chief of Staff, expects the appointment of Gen. Orval Cook as overall materiel czar will strengthen both Air Research and Development Command and Air Materiel Command. He told AVIATION WEEK reaction reaching him from both commands has been favorable. One of Gen. Cook's most important tasks will be to eliminate previous overlapping of functions, Gen. Twining said.

Some timing officials of the National Aeronautic Assn. are wondering what will happen if Russia suddenly claims the world's speed record and asks Federation Aeronautique Internationale to certify it. NAA may press for a rule change at the FAI meeting in Istanbul next fall which would require that at least one observer from the country currently holding a record be present whenever an officially timed attempt to break that record is made. Pointed out one NAA official: "Their timing officials may be honest but you can bet they will say what their government tells them to say. As it is now, we can't be sure about their record claims because we can't be there to see them."

AVIATION CALENDAR

Nov. 2-3—Magnesium Assn., ninth annual meeting, Biltmore Hotel, New York, Convair's D. A. Tooley will discuss use of metal adhesives with magnesium.

Nov. 3-4—1953 Transport Aircraft Hydraulics Conference, sponsored by Vickers, Inc., Hotel Park Shelton, Detroit.

Nov. 4-6—Society of Automotive Engineers, meeting of Committee on Aircraft Hydraulic and Pneumatic Equipment, Statler Hotel, Washington, D. C.

Nov. 6-8—Air show and aviation exhibition, Mitchel AFB, climaxing New York City's week-long observance of 50th anniversary of powered flight.

Nov. 16-17—American Society for Quality Control, conference of the Aircraft Technical Committee, Biltmore Hotel, Dayton, Ohio.

Nov. 17-20—Aviation Distributors and Manufacturers Assn., 11th annual meeting, Jefferson Hotel, St. Louis.

Nov. 19-21—Symposium on Airpower, sponsored by Dallas Council on World Affairs, Baker Hotel, Dallas.

Nov. 19-21—National Aviation Trades Assn. 14th annual convention, Hotel Broadview, Wichita.

Nov. 23-24—Operations Research Society of America, fall national meeting, Statler Hotel, Boston.

Nov. 29-30—Society for Advancement of Management Conference, Hotel Statler, New York.

Nov. 30-Dec. 2—American Society of Mechanical Engineers, annual meeting, Hotel Statler, New York.

Nov. 30-Dec. 1—Fifth annual Air Cargo Day, ASME, Hotel Statler, New York.

Dec. 1-2—ASME's Frequency Response Symposium, Hotel Statler, New York.

Dec. 1-2—Second annual Heavy Press Program, ASME, covering helicopter transmission design features and turbojet components, Hotel Statler, New York. Luncheon honoring engineers' contribution to powered flight will be co-sponsored by ASME and IAS.

Dec. 17—Seventeenth Wright Brothers Lecture, U. S. Chamber of Commerce building, Washington, D. C. Aero Club Wright Day dinner, Hotel Statler.

Jan. 10-12—Institute of Surplus Dealers, trade show and convention, Madison Square Garden, New York.

Jan. 20-22—Operations Research in Production and Inventory Control, Case Institute of Technology, Cleveland. Speakers include Paul Stillson of Lockheed Aircraft Military Operations Research Division.

Jan. 25-28—Plant Maintenance & Engineering Show, International Amphitheater, Chicago. Conference will be held concurrently at the Hotel Conrad Hilton.

Feb. 3-5—Society of Plastics Industry, ninth annual division conference on reinforced plastics, Edgewater Beach Hotel, Chicago.

Apr. 5-6—Society of the Plastics Industry (Canada), Inc., 12th annual conference, Mount Royal Hotel, Montreal.

Apr. 29-30—American Society of Tool Engineers, 10th biennial industrial exposition, Convention Center, Philadelphia.

May 5-7—Third International Aviation Trade Show, sponsored by Aircraft Trade Shows, Inc., 71st Regiment Armory, New York.

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LETTERS

Business Aircraft

Following are texts of letters written to AVIATION WEEK as a result of a news story in our Oct. 5 issue announcing a new service for owners and operators of business aircraft.

Is there sufficient basic information about business aircraft? Editorially, we contend there is not.—RHW.

From Mr. Dubuque

The article about Robert Hewitt Associates—"Business Flying Gets Data Service"—in the October 5 issue of AVIATION WEEK was noted with considerable interest. However, the statement in the first paragraph that "reputable information about the field is scarce" is certainly erroneous and misleading.

For a number of years, NBAA (formerly CAOA) has been one of the principal authentic sources of information regarding all aspects of business flying. Every effort has been made to represent this segment of civil aviation factually and impartially. As a matter of fact, our association has leaned over backward to prevent incorrect data and misinformation reaching interested business organizations and the general public.

It might be of interest to know that Hewitt and his officials have contacted and visited us in Washington and we have gladly made available to them all of the material, statistics, and related data we had on file. Consequently, it was somewhat surprising to read Hewitt's statement that "there has long been a need for some sort of a central agency in the business aircraft field to provide for exchange of ideas and dissemination of information on common operation problems." NBAA has been doing just that for its members for years (see attached booklet) and it has proved highly beneficial to their overall business aircraft operations.

Virtually all of the services Hewitt indicates that they plan to perform are currently being conducted by the association. We have been carrying out these activities with little fanfare and it has really paid off through greatly increased membership.

Perhaps the most amazing statement made by Hewitt is "aircraft companies and manufacturing organizations are interested in producing new products for the business fleet, but they have not been able to do so because of a lack of knowledge on their part as to what is wanted and what is needed by the corporate owner." Our association continuously has bombarded the manufacturers with data regarding the needs and requirements of business flying, the necessity for aircraft designed and produced strictly for business operations, important changes needed in communication and electronic equipment, safety devices, instrumentation, and so on. A number of surveys have been conducted, roundtables held with manufacturers and suppliers, articles written, etc., so that due recognition would be given to the rapidly growing needs of the business aircraft operators. Somehow many of the manufacturers and suppliers have failed to take full advantage of the great sales potential in this field.

I'm sure that Mr. Hewitt didn't mean what he said in the remark "the corporate owner, on the other hand, doesn't possess sufficient knowledge to ascertain his needs properly." If he expects to build a service on the assumption that the operator of business aircraft is ignorant of his own requirements, then he has a hard row to hoe. Certainly, no operator would appreciate the view that he lacks intelligence enough to ascertain his needs. Our members have outstanding records of achievement in business aircraft operations and many are vociferous about the improvements that can be made by manufacturers and suppliers.

One thing that Mr. Hewitt is overlooking is that the largest majority of business aircraft owners operate single-engine airplanes such as the Bonanza, Cessna, Navion, Piper, etc. They are utilizing these aircraft for many and varied business purposes and cannot be ignored in favor of the more lucrative multi-engine aircraft owners. Both single and multi-engine aircraft have played and are playing an increasingly important role in the development of business flying throughout the nation. The problems of the owners of these aircraft are basically similar. Both must be considered if business flying is to continue its phenomenal growth and development.

It is sincerely hoped that the above comments will set the record straight and not leave the impression that the interests of the business flyer have been overlooked or neglected.

JEAN H. DUBUQUE, Exective Director
National Business Aircraft Assn., Inc.
Washington 5, D. C.

From Mr. Hewitt

First, I would like to point out that NBAA has had my personal support from its inception and as soon as fixed-base operators were permitted to join, my former company became a member. In 1949 we opened the executive air terminal of metropolitan New York at Teterboro and actively promoted and publicized the NBAA (CAOA), made an office available to the late Mr. Silsbee, and made available to him all of our records on aircraft and aircraft owners. I supported the association then and continue to do so.

Although I have never had the opportunity of meeting Mr. Dubuque, our Mr. Peterson did visit him in Washington this past June seeking first hand information on the published NBAA surveys on behalf of one of our clients. He was most cooperative.

In spite of Mr. Dubuque's comments, after years of experience with business aircraft and having devoted all our time for the past year accumulating specific data on business aircraft, we must reiterate that we found the central problem was lack of accurate statistical and factual information on which the manufacturer could make a market decision.

There can be no question that the manufacturers are capable of developing new products and services; but, before they can invest the capital necessary they must have the answers to:

(1) Who are the specific prospects?

(2) What do they specifically want and need?

(3) Can a profitable number of units be sold to them?

The basic information for answering these questions is not available in accurate detail. One of the reasons it is not available is that there has been so very little marketing research done in this field.

Our approach toward bringing out this latent data was the development of a reference manual of standard operating procedures to standardize business aircraft operation, where practical, and through a supplemental service to keep the manual current. From this partial standardization, we will develop a reporting service to collect marketing data for the aircraft industry for their development of new products and services, as well as to use the data to assist the business aircraft operator to improve his present operation. Incidentally, contrary to Mr. Dubuque's statement, according to all NBAA literature and reports to us by some of their members the above specific services are not offered to the members or the aircraft industry.

Our services to date have been developed for the twin-engine owner only because our clients have been twin-engine owners and manufacturers. Our services are available, privately and confidentially, to any and all for a fee. We are not a non-profit organization nor are we an association representing a membership. It is therefore obvious that we are neither ignoring nor neglecting the single-engine owner since he can avail himself of our services on a consultation basis at any time.

Our programs and services are based on the business aircraft owner's intelligent analysis of facts, from which he can determine his wants and needs. We furnish the facts; he the intelligent analysis. Can it be said that the company who seeks the services of a building consultant to advise on proper layout, utilization, style, materials in construction of a new factory—"is ignorant of his own requirements?" I think not.

Further, I am quite aware of the fine records of NBAA members. In fact, I personally assisted a number of them with their business aircraft conversions, operations, serviced them, and recommended they join the association.

We believe that it will take cooperation, skill, imagination, know-how and an investment of a considerable sum of money to develop the information the aircraft industry needs to permit it to invest in the development of products and services for the business aircraft owner.

ROBERT M. HEWITT, President
Robert Hewitt Associates
439 Madison Avenue
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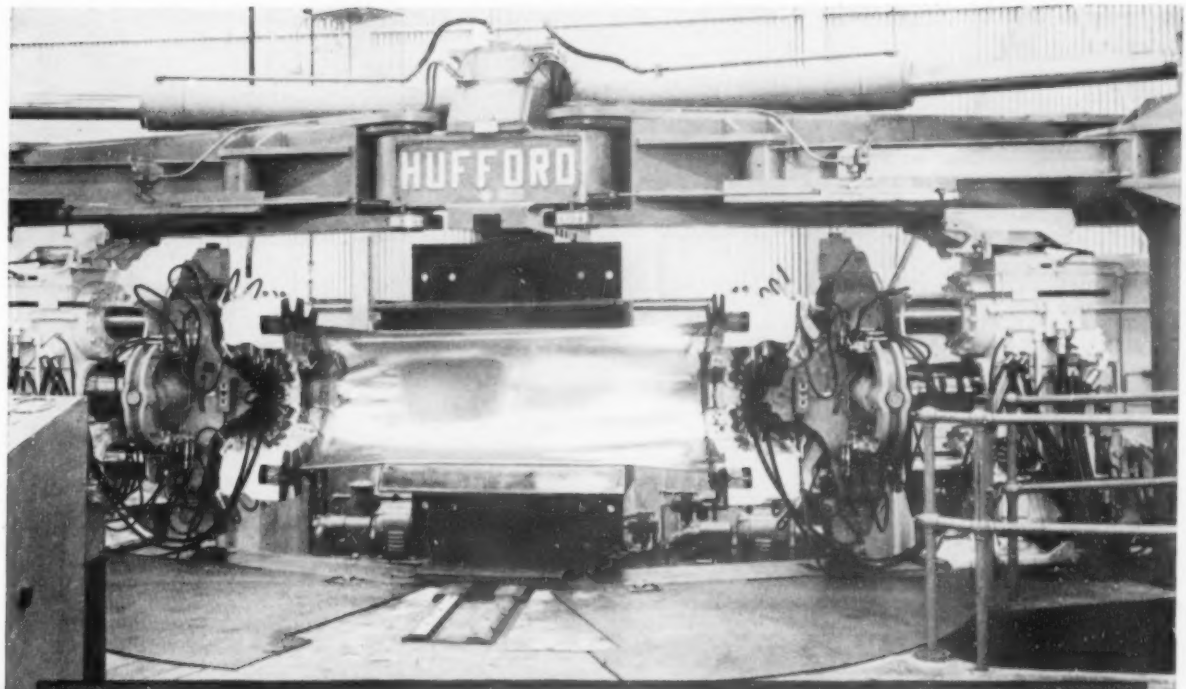

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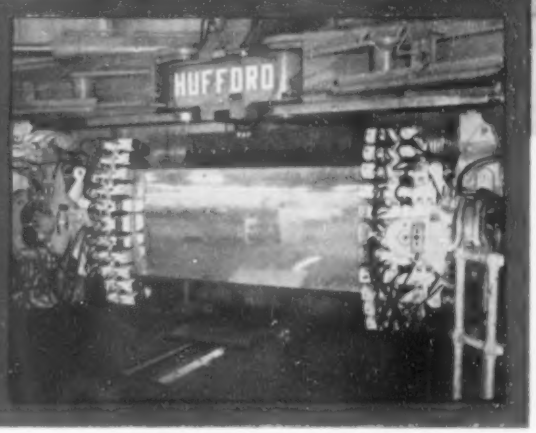

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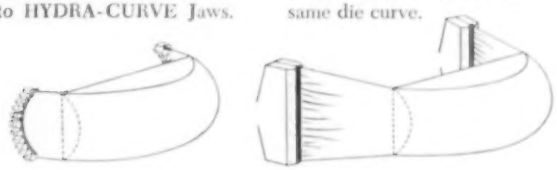

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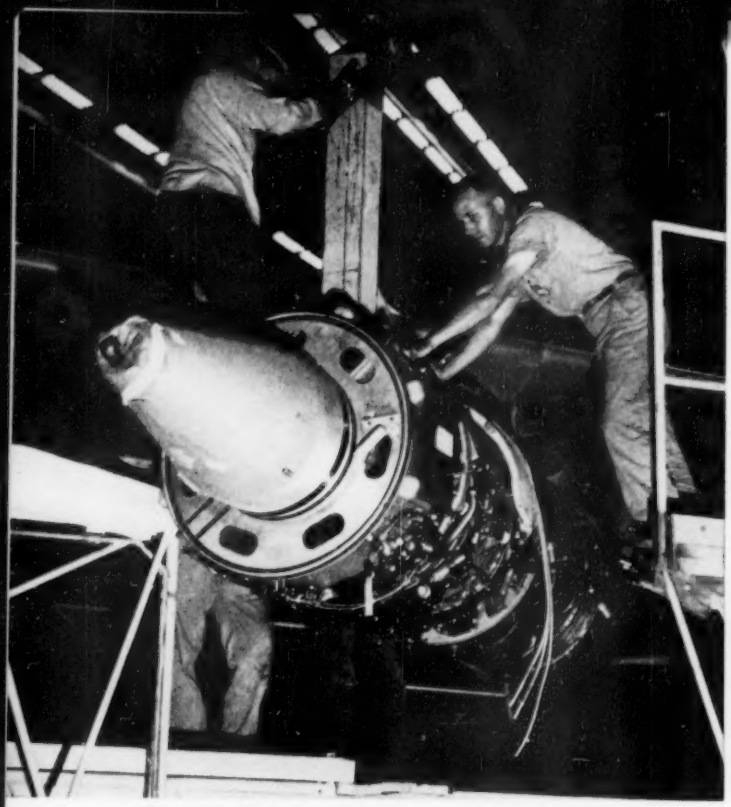

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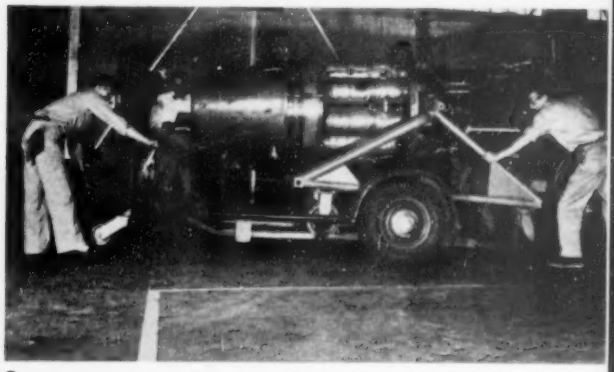

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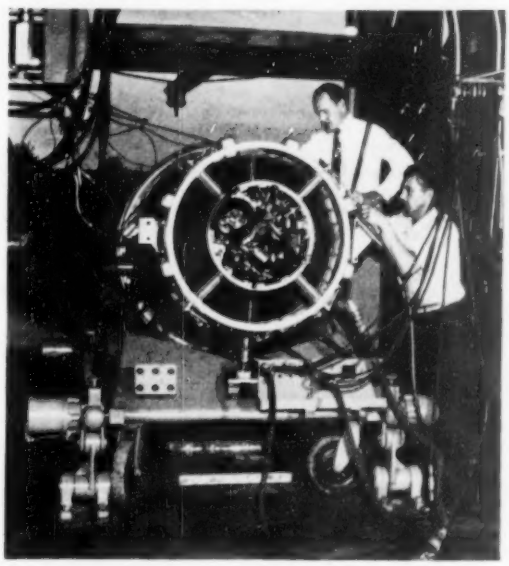

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